STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

For forty-eight years—IRON TRADE REVIEW

Contents . . . . May 17, 1937

Volume 100 - No. 20

As the Editor Views the News 13

SWOC Backs Down, Agrees to Elections 15
Triple Supply Convention Sees Prosperity Returning 17
Bethlehem Demonstrates Light Framing 19
Heavy Steel Shows Consistent Gain 22
Rules Against Scrap Embargo 23
Steelworks Operations for the Week 23
Men of Industry 24
Obituaries 25
Millions For Power Tools For Home Workshops 28
Mirrors of Motordom 31
Windows of Washington 35

Industry Feels Need of Better Training for Top Executives—*Editorial* 37

The Business Trend—Charts and Statistics 38

Special Operations Feature Wash Tub Manufacture 40
Automotive Die Castings—Part III 43
Materials Handling 49
Power Drives 52
Purchasing Agents' Convention Program 54
Progress in Steelmaking 56
Report of Porcelain Enamel Forum 58
Surface Treatment and Finishing of Metals 63
Welding, etc.—*Robert E. Kinkead* 66
Foundrymen Discuss Problems at Convention 69
New Equipment Descriptions 74
Recent Publications of Manufacturers 84

Market Reports and Prices 87-108

New Construction and Incorporations 108

Index to Advertisers 116

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Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States, Cuba, Mexico and Canada, one year $4, two years $6; European and foreign countries, one year $10. Single copies (current issues) 25c.

Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.

Copyright 1937 by the Penton Publishing Co.

Published by THE PENTON PUBLISHING CO., Penton Building, Cleveland, O.
John A. Penton, *Chairman of Board;* E. L. Shaner, *President and Treasurer;* J. R. Dawley and G. O. Hays, *Vice Presidents;* F. G. Steinebach, *Secretary.*

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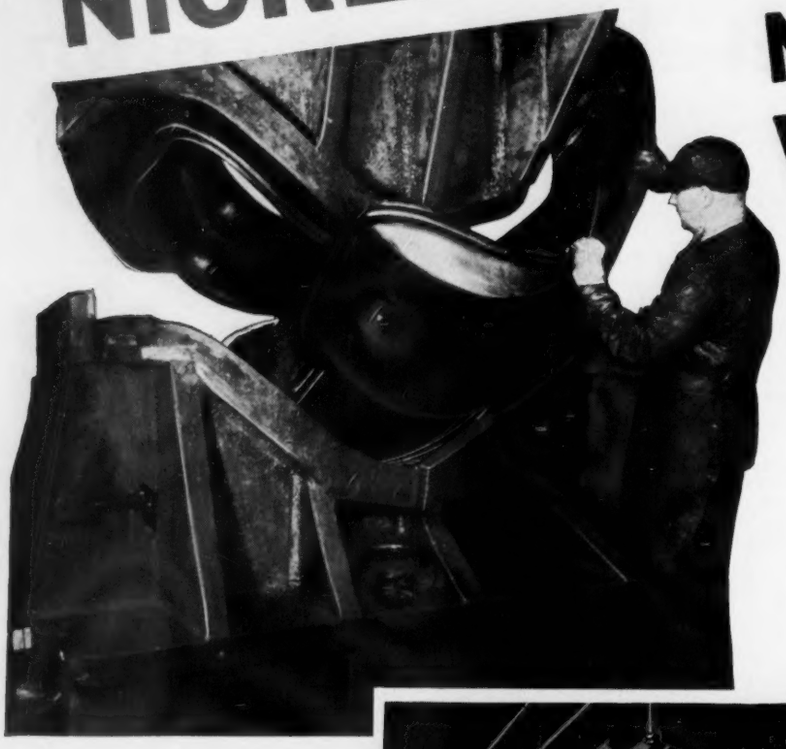
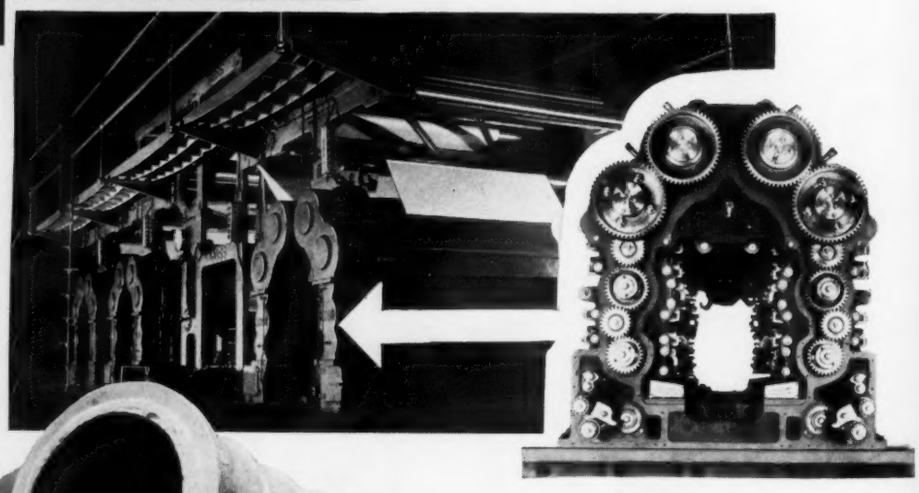


Among the metals whose commercial use dates back for centuries is cast iron . . . a material that has always been highly respected for its adaptability, machinability and low cost. Times have changed . . . so has cast iron — thanks to scientific foundry practice and the intelligent use of alloying elements — principally Nickel. Considerably stronger, harder and more wear-resistant than the unalloyed product, Nickel Cast Iron is economical for many modern applications. For example, the Nickel cast iron fender forming die pictured here is capable of stamping out more than 30,000 automobile fenders without redressing. This performance is 3 to 6 times greater than is possible with plain grey iron and results in fewer interruptions of the production schedule for regrinding operations as well as appreciable reductions in maintenance costs.



Here is a modern newspaper press manufactured by Goss of Chicago in which all the gears are made of Nickel Cast Iron. In selecting this material for this application, Goss engineers were able to take advantage of the initial economy of cast iron. In addition, they obtained gears capable of withstanding the stress and wear of high speed operation — thanks to Nickel.

NICKEL CAST IRONS

Modern railroads cannot tolerate excessive locomotive failures. For instance, in cylinders, due to the trend towards greater tractive effort at high speeds, higher boiler pressures and superheated steam with its increased cylinder temperatures, strength, density and pressure tightness are the prime requisites. That is why railroads are turning more and more to Nickel Cast Iron for this purpose and various other applications demanding these all-important properties.

Our casting specialists will be glad to consult with you and suggest where the Nickel Cast Irons will effect economies in your plant or equipment.

THE INTERNATIONAL NICKEL COMPANY, INC., NEW YORK, N.Y.

As the Editor Views the News

NOW that the curtain has been rung up on the second act of steel's labor relations drama, the spectators are agog with suspense. The high point of the first act — U. S. Steel's surprise compact with CIO — is forgotten in the fascinating plot of the moment. The spotlight now rests upon the independents and their strategy in dealing with the politically inspired alliance of the government administration with professional labor unions. Strangely enough, J. & L., Republic, Sheet & Tube, Bethlehem and other independents currently exposed to trouble are relying upon the letter and spirit of the one-sided Wagner bill to protect their interests.

• • •

For instance, J. & L. offered to sign an exclusive contract with any group of its employes receiving a majority vote in a supervised election (p. 15), or a contract with CIO for its own members, providing an identical agreement be made with non-union employes. Union officials rejected these proposals and strikes at Aliquippa and South Side ensued. In 32 hours the men were back at work with the understanding that an election will be held May 20. In other words, CIO accepted the company's original terms, which conform to the specific provisions of the Wagner act.

Rely on Wagner Act

• • •

Meantime Republic issued a 7-point statement (p. 16) explaining its reasons for refusing to sign a contract with CIO. These reasons are closely tied in with specific provisions of the Wagner act. Republic stresses the point that both parties to a contract should be responsible and that "signing of C.I.O. contracts in other industries has not resulted in industrial peace". As if to emphasize this latter point, several sit-down strikes broke out in General Motors plants at the very time that Republic's statement was being distributed to employes. The essence of the week's labor developments is that the independents are seeking justice for their non-affiliated employes and are working along lines which conform strictly to the tenets of the Wagner act. The J. & L. election will be watched with interest, but it will fall short of deciding the issues involved.

Seek Justice For Employes

• • •

When a group of new machines is installed in a metalworking plant, the application of power to these machines involves the selection and mounting of motors, electrical control apparatus, and necessary wiring. An electrical engineer of a leading automobile company who recently was charged with the responsibility of purchasing, installing and putting into operation considerable mechanical and electrical equipment of this kind (p. 52) thinks that the problem is unnecessarily complicated. He offers several suggestions which probably would simplify the arrangements of installation and also would insure a better job all around. His views should interest machinery builders and manufacturers of electrical equipment and supplies, as well as all operating and maintenance officials. Perhaps a greater degree of co-ordination is in order.

Co-ordination Is Needed

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Although the pressure of new demand has been relieved somewhat and mills and manufacturers in some lines are catching up on orders (p. 87), the volume of shipments still is great enough to threaten occasional local freight car shortages. One of the regional shippers' advisory boards has issued a bulletin to shippers asking them to co-operate in three ways: 1. Load and unload cars promptly. 2. Give advance information to railroads regarding probable car requirements, specifying destination and route. 3. When loading cars made empty at your plant, load each car to or in the direction of its owner. These suggestions are timely and reasonable. By heeding them, shippers can minimize and perhaps avoid difficulty in obtaining cars when needed.

Help Avoid Car Shortage

E. L. Shaner

Preview of the Steel You Buy from Inland

● Ready for the blast furnaces . . . these stacks of iron ore and limestone have special significance for the Inland customer.

Brought together from Inland's own mines and quarries, they typify Inland control of quality and uniformity at every stage of steelmaking.

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SWOC Backs Down, Agreeing to Elections; Threatens More Walkouts

THREATS against other steel producers by the SWOC became more menacing last week as the strike at Jones & Laughlin Steel Corp.'s Aliquippa and South Side plants was settled and 26,000 men who were out 32 hours, returned to work.

In issuing a call for a meeting of his executive committee in Pittsburgh, Phillip Murray, SWOC chairman, specifically named Republic Steel Corp., Youngstown Sheet & Tube Co., and the Crucible Steel Co. of America. He stated that "despite the fact that 130 steel and metalworking companies have signed with the union, Republic and Sheet & Tube have flatly refused to sign such contracts.

"So great has been the pressure put on us by our union members to secure written collective bargaining contracts we do not feel justified in continuing longer fruitless efforts to persuade these companies to sign contracts when there is every reason to believe they have no intention whatever of doing so.

"In the event it becomes necessary to suspend work, a sufficient number of maintenance employes must be available to protect mills and equipment as well as to protect furnaces which may have been charged."

Pittsburgh Steel Strike Settled

A one-day strike at the Allenport and Monessen plants of Pittsburgh Steel Co. affecting around 6000 persons was settled late Friday afternoon on much the same basis as the Jones & Laughlin controversy. A government supervised election will be held in the early part of June.

The Pittsburgh Steel Co. strike was not officially called by the SWOC but workers began straggling from their posts Thursday night and by Friday the plants were idle. The agreement to end the strike was reached in the offices of John J. Heard, attorney for the company. The company expected to be in full operation late Friday night.

SWOC last Friday accepted Jones & Laughlin's offer of an election, to be conducted by the national labor relations board, Thursday, May 20. The corporation's plants which had been running at capacity for the past three months, quickly resumed operations.

Outcome Hangs on Election

SWOC will be granted an exclusive bargaining contract by the company in the event a majority of employes select the union as their bargaining agency. Pending final determination of this question both sides will adhere to terms and conditions of the "standard agreement" in effect in United States Steel Corp. plants.

This was substantially the same offer which the company made before the strike began last Wednesday night. SWOC rejected this plan, and also refused another contract for its workers with the provision that all other employes also be given the right to a signed agreement for collective bargaining.

Both sides have pledged to refrain from coercion in connection with forthcoming election and to co-operate fully with the labor relations board. H. E. Lewis, Jones & Laughlin chairman, said:

"We have met the situation in the spirit of the day and both sides tried to be helpful in deciding the problems. We are very happy that our employes are able to resume work.

"Whoever wins the election will have an exclusive bargaining contract. This we offered to the Steel Workers committee before they went on strike. All our negotiations have been amicable. James F. Dewey, of the federal labor department, has been very helpful."

Mr. Lewis was asked if this were the first time Jones & Laughlin had agreed with an outside steelworkers union. He pointed out that some 30 or more years ago the company had dealings with the Amalgamated Association of Iron, Steel and Tin Workers and also the Sons of Vulcan.

Ernest Dunbar, labor board head in the Pittsburgh area, joined conferences between Mr. Lewis and Murray Thursday night and Friday morning to help work out details of the election.

Announcement that the strike would end came at 10:30 a. m. Friday, and workers returned to plants for the regular 3 o'clock shift that afternoon. The company reported there had been no order cancellations from customers during the brief strike.

Terms Previously Offered

Settlement terms are essentially those offered by the company before the strike began and which were outlined in a statement by Jones & Laughlin last Wednesday night:

"While the provisions of the Wagner act do not require a signed contract, Mr. Murray was advised that Jones & Laughlin Steel Corp. would sign a collective bargaining contract with the SWOC for its members in the employ of the corporation, providing that employes not belonging to that organization shall have the right to an identical contract and which they have asked for.

"Mr. Murray was also advised that Jones & Laughlin Steel Corp. is agreeable to signing a contract for exclusive collective bargaining with the group or organization obtaining the votes of a majority of the employes in an election at its plants under supervision of the Na-

J & L's New $25,000,000 Continuous Strip Mill To Be in Full Production This Month

JONES & LAUGHLIN STEEL CORP.'S new $25,000,000 continuous wide strip sheet mill—in the foreground of this night scene—will be in full operation some time the latter part of May.

It is within sight of the Golden Triangle in Pittsburgh. The illuminated tip of the Gulf building may be seen in the distance, at the right. Across the Monongahela river from the mill the bessemers are blowing.

The 96-inch mill has a rated capacity of 75,000 tons a month. Buildings which house the hot mill and the cold finishing mills extend nearly half a mile in length, occupying an area of more than 25 acres.

Products will be hot and cold-rolled strip; hot and cold-rolled sheets; painted and galvanized roofing and siding and sheets for porcelain enameling. The hot mill went in early this year.

The principal rolling equipment in the hot mill consists of ten four-high stands and two two-high scale breakers, all combining the latest developments. Machinery in the cold reducing mill is of the same general type, except finishing stands vary from two to five in a unit. They are of four-high design.

Modern continuous annealing furnaces and pickling vats, with improved facilities for handling, forming and cutting, make this new mill one of the most efficient units of its kind.

All equipment in the various buildings has been so arranged as to reduce to a minimum all back tracking of materials from one finishing department to another. An article at the time of dedication will give full details of this mill.

It is the first mill of its type to be built in the Pittsburgh district, and one of five of the great continuous strip-sheet mills to be completed or under construction in this country since Jan. 1.

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tional Labor Relations board as provided in the Wagner act.

"It is unfortunate that the SWOC should strike the steel mills while, as Mr. Murray states, conferences were still in progress."

Republic States Policy

"Membership or non-membership in any organization is not a requirement of employment," a letter from Republic Steel Corp., Cleveland, addressed individually to its 55,000 employes last week emphasized. The statement to employes followed a conference between Republic and SWOC officials during which the company declined to sign a union contract. Seven reasons for refusing to sign were outlined as follows:

Thousands of employes have protested against company signing contract, holding they now have a successful collective bargaining plan.

Wages, hours, safety provisions, vacation plan, seniority rules and methods of handling grievances provided in the union contract are no more favorable than those now enjoyed.

The CIO would not assume the same responsibility the company would be forced to assume by signing the agreement.

Company's policy is that no employe has to join a union to get or hold a job.

Signing of agreement would be unfair to those who do not favor the union as their collective bargaining agency.

It would disturb present harmonious relations and break down mutual confidence that has existed in collective bargaining between workers and management.

Contracts with CIO have not prevented disturbances in other industries. Sitdown strikes in automotive industry and other interruptions were cited.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., last week signed a contract with United Mine Workers specifying payment of the Appalachian wage increases to the southern company's 5000 coal miners. This was the fourth important iron and steel company in the Birmingham district to sign up for its captive-mine employes, leaving Republic Steel Corp. the only captive-mine operator without contract with the union. Negotiations with

Republic are expected to be started soon.

District mines were closed for approximately six weeks and much surplus coal was consumed. Coke production was not disturbed.

FIVE GM PLANTS AFFECTED, UAW TO ASK CLOSED SHOP

Strikes in five General Motors Corp. plants in Saginaw, Mich., Cleveland, and Janesville, Wis., last week-end affected 15,600 employes. Meanwhile, the United Automobile Workers hinted it will demand closed shop in a new agreement it will seek with General Motors June 11.

Union charged the Cleveland strike was caused by a movement of stamping work to Grand Rapids, Mich., where the UAW is weak. Strikers at the Chevrolet foundry in Saginaw refused to return despite orders of union officers. Late Friday a truce was declared at Cleveland, pending negotiations this week.

Rolling Mill Co. Will Train More Apprentices

Anticipating increased need for skilled labor, the American Rolling Mill Co., Middletown, O., practically will double its apprentice training program within the next 30 days. The training course, inaugurated last October, covers four years and is conducted in co-operation with the International Correspondence Schools, Scranton, Pa. Subjects studied are selected to fit the particular trade or craft the apprentice chooses. At present the program includes apprentices in the carpenter and tin metal working shop, machine, electrical repair, welding, rigging, pipe, and blacksmith shop, and power and boiler house.

Directed by a supervisor who maintains close personal contact with apprentices and their problems and who correlates classroom studies with shop work, apprentice training is now in effect in all of the company's major plants.

Gray Iron Founders Issue 1937 Directory

Gray Iron Founders' Society Inc., Cleveland, has issued a directory of members for 1937. Member foundries are arranged by states and an alphabetical index gives ready reference by name.

The directory gives names of officers and type of foundry for each member foundry as well as the location. Officers and committees of the society are also included.

Triple Supply Convention Sees Prosperity Returning

NINETEEN THIRTY-SIX was the most profitable for industrial supply and machinery distributors in recent years, it was shown at the annual triple convention of the Southern Supply and Machinery Distributors, National Supply and Machinery Distributors' and the American Supply and Machinery Manufacturers' associations, held at Memphis, Tenn., May 10-12.

In 1936 distributors' net profit increased about 90 per cent over 1935. However, last year's profits were not large.

Survey of 83 representative distributing organizations revealed they earned an average net of 3.32 per cent. Of these, 79 showed an average profit of 3.41 per cent, while the remaining four suffered an average loss of 1.69 per cent. The 79 companies showing a profit had average expense of 19.20 per cent. This included administrative overhead, office salaries, boxing, packing and trucking, store and warehouse salaries, salesmen's salaries and expenses, rent and real estate charges. Turnover averaged 4.05 per cent.

Taxes Up 130 Per Cent

Mounting distributing costs was stressed by P. Ridings, Syracuse Supply Co., Syracuse, N. Y., president of the National association. A recent calculation, he declared, showed that distributors' taxes have increased 130 per cent since 1929. While some manufacturers have increased margins to distributors, others have not. The latter group must take similar action to enable distributors to function efficiently, he said. H. E. Ruhf, Cleveland Tool & Supply Co., Cleveland, chairman of the National association's committee on relations with manufacturers, expressed belief that distributors' costs will continue to mount, that margins in many cases are too narrow and that this whole subject is as important to manufacturers as to distributors. Jobbers also have responsibilities, one of which is to maintain resale prices, he said. Similar views were expressed by C. A. Dillon, Dillon Supply Co., Raleigh, N. C., president of the Southern association. In general, remarks showed that relations between distributors and manufacturers are best that have obtained in recent years. List of supplies and machinery in which margins have been increased since last December was impressive.

A unique convention feature was presentation, under auspices of the manufacturer-distributor relations committees of the National and American associations, of a recorded three-act drama covering such relations. This revealed the various values resulting from sound manufacturer-distributor hook-ups and cited both fair and unfair practices.

The Robinson-Patman act is a "nighmare" and will continue so until the Supreme Court rules on test cases now pending, declared George A. Fernley, advisory secretary, National association. Prevailing legal opinion, he said, is that the act will be found to be constitutional in the main. Since last December the act has been taken with increasing seriousness and many large companies are trying to formulate their policies in accordance with its provisions. Mr. Fernley said that while the act does not make definite provision for functional discounts to jobbers, it now is taken for granted that such discounts are not illegal, although this point needs clarification. Quantity discounts also are regarded as legal when it is obvious that they are not intended to discriminate at the expense of small consumers. A dangerous feature is the provision that an injured party can recover three times the amount of actual damage, plus lawyers' fees and costs, from a discriminating party. Mr. Fernley advised distributors as well as manufacturers to keep themselves fully informed on interpretations and implications of the law.

Reviews Proposed Legislation

Pending legislation important to jobbers includes a bill to outlaw reciprocal selling, one that would make it illegal for a nonmanufacturing organization to take away customers from a manufacturer and the Tydings-Miller bill which would permit manufacturers to enter into resale contracts. None of these will come to a vote during present session of congress, it was believed.

Some discussion was directed at warehouse stocks maintained by many manufacturers, especially at New York and Chicago, from which products are sold at factory prices. One speaker asked whether this practice is legal under the Robin-

son-Patman act inasmuch as selling from warehouse stocks necessarily costs more than shipping from plant. Robinson-Patman act provisions well might cause cessation of this practice, several jobbers opined. It was reported, however, that this situation is less acute now as some companies have discontinued practice of quoting factory prices on products shipped from warehouse.

Volume business is essential if distributors are to prosper and function efficiently, several jobbers declared. Practice of many manufacturers to sell direct to some consumers and through distributors to others should be modified, according to dealers' belief. Jobbers were advised to stick to manufacturers who are most liberal, but not to allow an extra discount lure them away from desirable connections.

Too large discounts are undesirable under competitive conditions, it was averred. Scientific study by the National association to determine economic margins for certain goods and under varying conditions was recommended.

An interesting paper on wage negotiation and adjustment technique was presented by W. F. Cook, Kimberly-Clark Corp., Neenah, Wis. After studying wage factors for a period of 20 months, his company found that only by full co-operation of management and labor could it fairly evaluate different jobs in its operations and arrive at fair wage rates. A joint committee meets quarterly to review all rates and make necessary readjustments. This committee includes equal representation of management and men and visits all of the company's seven plants. It has power to adjust grievances and wage rates. Deadlock are submitted to an arbitration board of one man chosen by management and one by the workers, these two selecting a third. Board's decision in all cases is final.

Membership Sets New High

National association membership increased by 50 during 1936 and now totals 357, highest figure in the association's history with exception of the NRA period. H. R. Rinehart, the association's secretary-treasurer, detailed the diversified services which the association extends to members.

The industrial supply research association will continue its effort, by advertising in business papers and by other activities, to persuade industrial buyers to recognize the essential place of the industrial distributor. The Southern association will subscribe 100 per cent to bureau's support.

American association spokesmen pledged members to continued support of the bureau. National association officers suggested a committee be organized to make a drive for the bureau. Indications were that support from National organization members would be at least equal to that in the past. Those in charge of the bureau want at least $50,000 annually to promote business of industrial distributors. This would be five times the amount spent last year.

Reporting for committee on sales promotion literature of the American association, Chairman C. F. Conner, B. F. Goodrich Co., Akron, O., said manufacturers now are spending about $500,000 annually on literature intended to assist distributors in building up sales. At least 10 to 20 per cent of this amount can be saved and effectiveness of the literature can be improved, he said.

Present investment in power transmission in this country is $10,000,000,000 and 70 per cent of this is comprised of belt and pulley driven installations, said A. P. Homer, president, Power Transmission council, Boston. Development work sponsored by the council has resulted in drive methods which enable machinery operators to cut down power consumption 50 per cent in many cases, said Mr. Homer. Council proposes to employ more resident engineers in various parts of the country. Among their duties will be rendering assistance to those marketing power transmission equipment.

C. A. Dillon, Dillon Supply Co., Raleigh, N. C., contended that it is uneconomic for a distributor to seek business expansion by selling outside his natural territory. He deplored a recent tendency to sell far afield. Credit risks are greater and cost of rendering service increases.

Rising costs which recently have given considerable concern do not lower distributor's efficiency as long as he passes them along to his customers, said Edward F. Stauss, Oliver H. Van Horn Co. Inc., New Orleans. Jobbers are watching their various lines and pushing those offering most profit. More attention is being given to trade and business papers, for the valuable lessons they contain.

Rising costs, averred George H. Cherrington, Standard-Machinists

Fiery Cascade Initiates New Ford Coke Ovens

WITH this first blazing discharge of red-hot coke, the Ford Motor Co. recently placed in service at its Rouge Plant, Dearborn, Mich., two new 61-unit batteries of coke ovens. The batteries provide an additional 8,000,000 cubic feet of fuel gas daily for plant operations. Beside the gas produced, the Ford ovens daily yield nearly 4000 tons of coke, and large quantities of by-products

Supply Co., Pittsburgh, are forcing distributors to be more efficient. He urged jobbers to study their lines and discontinue the unprofitable ones.

Since installing a perpetual inventory system, Columbus Iron Works Co., Columbus, Ga., has been able to reduce inventory approximately 50 per cent while increasing sales 25 per cent. Turnover has been increased from 1½ to about 8 times a year. The system checks accurately within 0.5 per cent. He warned that the matter of records must be considered carefully. Records sufficient for a small distributor might be totally inadequate for a larger concern.

No longer does the buyer need to beware, stated Jack R. Dale, Briggs-Weaver Machinery Co., Dallas, Tex. Business in recent years has built up a great wall for the buyer's protection. Modern conditions permit prosperity only to distributors who give customers honest and intelligent service. He outlined methods for training distributor salesmen, saying that while good personality is desirable, the really essential qualifications are possession of full information and ability to tell the truth.

Keep Salesmen Informed

Charles E. Curtis, Western Iron Stores Co., Milwaukee, asserted it is desirable to give salesmen complete data on transactions that they may answer all questions correctly.

"Experience in Distributor Selling," was the title of a paper submitted by Phillip G. Callaghan, General Refractories Co. The company sells about half its output to the iron and steel and nonferrous metal producing industries. Remainder goes to the miscellaneous market. Company found the best avenue to this business was through distributors.

American Supply and Machinery Manufacturers' Association Inc. elected following officers: President, Roger Tewksbury, Oster Mfg. Co., Cleveland; first vice president, W. A. Purtell, Holo Krome Screw Corp., Hartford, Conn.; second vice-president, Herbert P. Ladds, Lamson & Sessions Bolt Co., Birmingham, Ala.; treasurer, E. S. Grant, Dodge Mfg. Co., Mishawaka, Ind. R. Kennedy Hanson, Pittsburgh, was re-elected secretary-manager. Executive committee was organized as follows: Chairman, D. W. Northup, Henry G. Thompson & Son Co., New Haven, Conn.; H. K. Clark, Norton Co., Worcester, Mass.; C. O. Drayton, Graton & Knight Co., Worcester, Mass.; R. G. Thompson, Lufkin Rule Co., New York; Thomas

(*Please turn to Page* 107)

Bethlehem Demonstrates Light Framing; Delivered "Like So Much Lumber"

ADAPTION of a light-load type of steel framing to dwelling houses is being demonstrated by the Bethlehem Steel Co. at the American Homes exposition now being held in Madison Square Garden, New York.

Two diminutive residences, with the brick and tile facing purposely left incomplete to show the steel framing members and how they are applied, are displayed.

The light-load type of steel framing has been developed by the Bethlehem company and it is already being utilized in the construction of schools, apartment houses and similar structures.

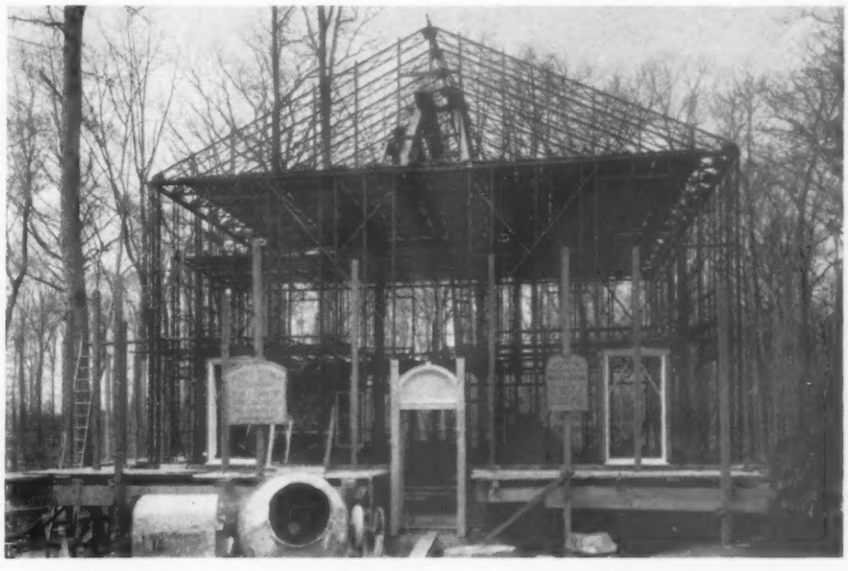
This type utilizes open-web joists and studs in the peaked-roofed model. These joists and studs are somewhat similar to the conventional steel I-beams, only the web or central section is of open-work or latticed construction, increasing the structural strength of the steel as well as providing other advantages.

In the modern flat-roofed model, on the other hand, what are termed wide-flanged sections are employed as joists, while the open-web members are utilized for the studding.

Houses employing one or the other of these types of light load steel framing have been constructed in representative sections of the country, from Texas to New England and there are also a number on the Pacific coast.

The cost of steel framing in dwellings is only slightly higher than in wood construction, according to George E. Routh, Bethlehem's manager of sales of building specialties. This increase, he asserts, is easily offset by the added security afforded from fire, and the greater permanence of steel.

One advantage claimed for Bethlehem light-load framing for residences is that it can be employed in any desired type of residential architecture, with the framing members delivered to the construction lot, like so much framing lumber. The steel members are erected by aid of electric arc welding and flame cutting. Solid web members are fastened with bolts.



Modern Home Under Construction with Light-Load Framing

Battelle Institute Offers Research Appointments

Four research associate appointments will be available at Battelle Memorial institute, Columbus, O., for 1937-38. Any college graduate is eligible for appointment although preference will be given men who have had one or more years graduate study in chemistry, physics, metallurgy, fuel technology or ceramics, or who have demonstrated marked aptitude for scientific research. Research associates will be members of a new division designed to extend the institute's work in fundamental science and to train research men for industry.

Total Steel in Use Tops Billion Tons First Time

Total steel tonnage in use in this country has passed the billion-ton mark for the first time in history, according to the American Iron and Steel institute. This represents an average of 17,800 pounds per capita.

If all steel in use were to be sold as scrap at present prices, it would bring $18,500,000,000, a sum greater than entire stock of money including gold and silver bullion stocks and currency in the United States. Several times that amount would be necessary if old steel were replaced with new steel.

In 1935, about 954,000,000 tons of steel were in use, equal to 17,000 pounds per capita. Longer life is being imparted to steel by progress in manufacturing, fabricating and preserving. As result less tonnage is being taken out of service.

Estimated tonnage in use includes steel in skyscraper skeletons, dams, railroads and other massive steel-built structures, and likewise the steel in automobiles, paper clips, carving knives and many other articles. In 1900 about 2600 pounds of steel per capita were in use; during next 30 years this increased steadily at rate of about 440 pounds a year to 8100 pounds per person in 1915 and 15,400 pounds in 1929. Increase was less during depression but since 1932 has averaged 480 pounds per capita.

Estimate of total tonnage in use was obtained by calculating cumulative yearly totals of steel produced and scrapped since 1865.

Stainless Steel Train Ordered by Reading Co.

Edward G. Budd Mfg. Co., Philadelphia, has booked an order for a light weight stainless steel streamlined train from the Reading Co. It will be operated twice daily between New York and Philadelphia, at high speed. It will cost about $500,000, will be air conditioned, with individual reclining seats, smoking lounges in each coach and dining facilities. Motive power will be a streamlined steam locomotive.

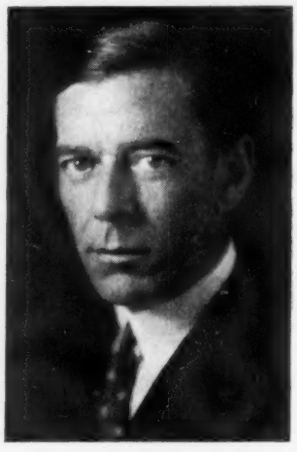
Luntz Will Offer Ohio Ordnance Plant for Sale

Luntz Iron & Steel Co., Canton, O., has purchased from the Morgan Engineering Co. an ordnance plant at Alliance, O., and will offer plant and equipment for sale.

Completed by the government in 1918, the plant practically never was used. It consists of a main erecting room, 90 x 880 feet, and five large bays. Buildings are served by six cranes ranging from 10-ton to 75-ton capacity.

Buildings are in excellent condition and can be dismantled to any desired length. Also for sale are 1000 tons of pipe, two 500-pound boilers with stokers, a locomotive and miscellaneous equipment.

Wickwire Spencer Reorganized; Long Receivership Ends



E. C. Bowers
President, Wickwire Spencer Steel Co.

After concluding one of the longest industrial receiverships on record, the Wickwire Spencer Steel Co. announces formation of a new company under the same name.

In October, 1927, E. C. Bowers and C. L. Feldman were appointed receivers. After continuing for seven years, the receivership was changed to a trusteeship on July 31, 1934.

The company was reorganized recently with E. C. Bowers, president; P. M. Macklin, executive vice president; R. L. Foster, vice president and general sales manager; and G. H. Creveling, secretary-treasurer.

American Wire Fabrics Corp., manufacturer of insect screen cloth, and the Wickwire Spencer Sales Corp. continue as subsidiaries, and all branch offices and warehouses continue as in the past at New York city, Buffalo, Chicago, San Francisco, Worcester, Los Angeles, Portland, Seattle, Philadelphia, Chattanooga, Tulsa.

44 Consumers Report 70 Per Cent Gain in Earnings

NET earnings of 44 companies among equipment manufacturers and other leading consumers of iron and steel for the first quarter, average 70 per cent higher than in the corresponding period last year. STEEL'S tabulation, May 3, page 20, included 19 companies, while the subjoined table lists 25. It is apparent from the great majority of quarterly financial reports that consumers' earnings have increased substantially, although in many instances provisions have not been made for surtax on undistributed profits. All figures are net earnings except where asterisk denotes loss.

	First Quarter 1937	First Quarter 1936
International Business Machines Corp., New York	$2,169,311	$1,889,921
Budd Wheel Co., Philadelphia	261,707	218,923
Edward G. Budd Mfg. Co., Philadelphia	426,455	346,250
A. M. Byers Co., Pittsburgh	138,861	184,234*
Square D Co., Detroit	214,073	122,232
Clark Equipment Co., Buchanan, Mich.	310,812	54,254
Black & Decker Mfg. Co., Detroit	243,597	185,713
Federal Screw Works, Chicago	27,965	9,499
Evans Products Co., Detroit	737,077	575,569
Savage Arms Corp., New York	41,749	114,511
Link-Belt Co., Chicago	737,586	307,133
American Radiator & Standard Sanitary Corp., New York	1,648,624	407,614
Borg-Warner Corp., Chicago	2,171,923	1,575,363
Yale & Towne Mfg. Co., Philadelphia	390,425	170,903
Cutler-Hammer Inc., Milwaukee	150,784	232,343
Victor Equipment Co., San Francisco	40,448	26,467
Eureka Vacuum Cleaner Co., Detroit	59,320	82,913
American Forging & Socket Co., Pontiac, Mich.	132,813	90,266
Walworth Co., New York	542,368	10,475
White Sewing Machine Corp., Cleveland	77,907	50,384*
Holland Furnace Co., Holland, Mich.	176,864	188,032*
Motor Wheel Corp., Lansing, Mich.	460,423	370,014
Pittsburgh Steel Foundry Corp., Glassport, Pa.	170,508	13,291*
American Steel Foundries, Chicago	1,057,752	461,220
Addressograph-Multigraph Corp., Cleveland	504,498	337,949

Steel Taxes, $105,850,000, 50 Per Cent Above 1935

Taxes paid by the steel industry in 1936 were equivalent to a year's pay for 74,500 employes, representing an outlay of $169 for each employe, according to the American Iron and Steel institute. In 1935, taxes were equivalent to $134 per steel employe and represented a year's pay for 55,640 workers.

Total of $105,850,000 was paid in 1936 to federal, state and local governments by 107 iron and steel companies producing more than 90 per cent of output.

Aggregate taxes paid last year was 50 per cent larger than in 1935, when the companies paid $70,837,000. Social security taxes, both fed-

eral and state, which were levied on 1936 payrolls, accounted for $9,845,000 of the $35,000,000 increase.

Social security taxes in 1937 will be materially greater than the 1936 total, because of larger payrolls, addition of old age pensions tax and higher rate for unemployment insurance reserves.

Tax payments in 1936 were 12 per cent of $889,634,000 total payrolls of the 107 companies and approximately equaled the $109,240,000 dividends to 456,106 stockholders.

States and subdivisions received 63 per cent of taxes in 1936, compared to 81 per cent in 1935.

April Machine Tool Orders at New High

Machine tool orders in April made a new high for recent years, according to the National Machine Tool Builders' association, Cleveland. The index of orders reached 282.5, compared with 211.6 in March and with 257.7 in December, the previous high. The index is based on 1926 as 100 per cent.

The gain was due to a heavy increase in domestic business, about one-third. Foreign orders were higher than in March but slightly under December.

Follansbee Bros. Co. April Sales Show Sharp Increase

Follansbee Bros. Co., Pittsburgh, reported April sales exceeded those of April last year by 71.1 per cent, exclusive of the Sheet Metal Specialty Co., 93.6 per cent owned subsidiary. For the first four months of 1937 sales were 66.6 per cent above corresponding period of 1936.

Sheet Metal Specialty Co.'s sales surpassed those of June, 1929, the previous high, by 7.3 per cent, and April, 1936, by 102.1 per cent. Sales for first four months of this year were 58 per cent above same period last year. Both companies have heavy backlogs.

Welsh Tin Plate Booms

A steadily rising demand accompanied by advancing prices, featured the Welsh tin plate market during the first quarter of 1937, according to American Consul S. Reid Thompson, Cardiff, in a report to the bureau of foreign and domestic commerce. There was a shortage of iron and steel scrap and pig iron during February which adversely affected the tin plate industry. Several mills were forced to restrict production temporarily owing to shortage of steel bars.

The Machine that "Remembers"—

MEMORY MACHINE AIDS RESEARCH: Westinghouse Research Laboratory has announced "a machine with an electrical memory capable of photographically recording events after they have happened. . . . Because the human mind is not capable of recalling every detail of rapidly recurring events this machine known as the memnoscope has proved of inestimable value in recording characteristics preceding certain actions of electrical apparatus." Mention is made of its use in determining why mercury arc rectifiers some times fail to "block." A laboratory machine, it will be applied to perfecting electrical apparatus

—And Some Things that May Be Remembered About Machines

MODERN machine tools are 200 to 300 per cent more productive than those of ten years ago.

Accuracy of these machines is as great as that found a decade ago only in laboratories, in gages and precision instruments.

Idle time of return movement of tools has been reduced, this doubling output in some instances.

Spindle speed has been greatly increased in metalworking machines using high-speed cutting tools.

Automatic measuring and sizing devices are built into machine tools today, to insure accuracy of product.

A camshaft machine recently perfected replaces 50 engine lathes and produces better camshafts.

An automatic machine removing from stock a ton of metal an hour in the form of chips has a conveyor to remove them to prevent the machine burying itself; another conveyor removes the finished work.

Four-high strip mills—machines—have multiplied by 36 the tonnage per man-hour attained on the conventional type of hand sheet mill.

An automatic gage mechanism on cold-rolling strip mills stops the mill when variation in gage occurs.

A pre-set mechanism on blooming mills allows the roller to push certain buttons for required dimensions of the bloom, then start the mill, which performs the necessary operations in sequence and repeats.

The mechanical feeder and catcher on sheet mills has lowered costs $3 per ton on black plate for tinning.

The mechanical tin pot feeder, with one operator for two pots, has lowered costs $2 per ton on tin plate.

Machinery turns out about 100 tin cans per year for every person in the United States, bringing canned food within reach of everyone.

Eli Whitney, inventor of the cotton gin, in manufacturing rifles for the colonial government, was the first to produce interchangeable parts. He had to invent and build the machine tools to make his jigs and fixtures—that was 139 years ago.

Heavy Steel Shows Consistent Gain

STEEL products made for sale during first quarter of 1937, totaling 11,347,300 gross tons, were 13.9 per cent greater than the 9,964,895 tons made in fourth quarter, 1936, and 50 per cent greater than the 7,526,774 tons made in first quarter, 1936, according to American Iron and Steel institute.

Revival in the heavier products is well shown by heavy structural shapes. In the first quarter this year total produced for sale was 704,326 tons, an increase of 25.1 per cent over the 563,200 tons in fourth quarter of 1936. The latter figure was 32 per cent greater than production of heavy shapes in the initial quarter of 1936.

Sheet production in first quarter, 1937, amounted to 2,283,091 tons, 8.6 per cent over the 2,102,176 tons in fourth quarter, 1936. Fourth quarter output was 37.6 per cent greater than in first quarter of 1936.

Rails, Bars, Plates Gain

Standard steel rails made a sharp upturn with 415,907 gross tons, compared with 194,893 tons in the final quarter of 1936 and 268,824 tons in first quarter, 1936. Steel bars made a consistent gain. In first quarter this year total was 1,845,649 tons, against 1,748,804 tons in fourth quarter and with 1,200,950 tons in first quarter, 1936. Steel plates at 808,313 tons compare with 655,664 tons in fourth quarter and 430,557 tons in the initial quarter last year.

Figures in the accompanying table include reports from 174 companies and the tonnages represent 71.9 per cent of ingots produced by the companies whose products are included. Total production less shipments to members of the industry for conversion into further finished products during first quarter totaled 10,134,471 gross tons, 84.6 per cent of finishing capacity.

Fuel Oil Tax Would Add to Steel Costs

Protest against enactment of a proposed 2 cents a gallon fuel oil tax was made recently before the ways and means committee of the Pennsylvania legislature by Robert W. Wolcott, president, Lukens Steel Co., Coatesville, Pa. Imposition of the tax, Mr. Wolcott said, would work a particular hardship on smaller industries which are dependent on this type of fuel and lack their own supply.

"The smaller steel companies of eastern Pennsylvania are using annually approximately 250,000 gallons of fuel oil. This tax would impose a burden of $5,000,000 on this industry and would be equivalent to more than $3 per ton of steel produced," he declared.

Competition in a national market would prevent Pennsylvania industries from adding additional cost to price of product and the increased burden would force many smaller industries out of business, he said.

"Two More Good Years In Export Trade"

"With normal business as active as it is today, both in England and on the Continent, it is my belief that American manufacturers can look forward to at least another two years of good export trade," states Clifford S. Stilwell, vice president, Warner & Swasey Co., Cleveland machine tool builders, who has just returned from a trip abroad.

"Machine tools, for instance, are needed in Europe in large quantities, entirely independent of the demand for rearmament purposes. Furthermore, on the continent defense programs are not materializing at any such rate as has apparently taken place in England. I would say that basically the demand for American-made tools arises, just as it does in this country, from the growing use of modern conveniences and devices."

European war in the immediate future appears considerably less probable than a few months ago.

"Of course, there is still plenty of war talk all over Europe, but general sentiment indicates less likelihood of war breaking out in the near future. This change in attitude seems largely due to England's defense program. In fact, I often heard it said on the Continent that 'if England can be ready in time, there won't be any war'."

		Number of companies	Item	Annual Capacity Gross tons	Production for Sale—Gross Tons, First Quarter—1937: Total	Per cent of capacity	Shipments: Export	Shipments: To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	31	1	xxxxxxx	1,109,998	xxx	13,366	699,337
	Heavy structural shapes	9	2	5,057,120	704,326	55.7	28,268	-
	Steel piling	4	3	264,800	23,012	34.8	1,480	-
	Plates—Sheared and Universal	22	4	6,645,249	808,313	48.7	54,766	6,758
	Skelp	7	5	xxxxxxx	174,670	xxx	9,124	117,257
	Rails—Standard (over 60 lbs.)	4	6	3,906,000	415,907	42.6	1,741	-
	Light (60 lbs. and under)	5	7	757,820	27,325	14.4	2,220	-
	All other (Incl. girder, guard, etc.)	2	8	140,000	15,165	43.3	1,243	-
	Splice bar and tie plates	14	9	1,530,693	186,302	48.7	652	-
	Bars—Merchant	41	10	xxxxxxx	1,192,453	xxx	17,427	140,395
	Concrete reinforcing	28	11	xxxxxxx	191,400	xxx	6,777	-
	Cold finished—Carbon	18	12	xxxxxxx	204,817	xxx	1,308	-
	Alloy—Hot rolled	14	13	xxxxxxx	212,730	xxx	1,697	15,015
	—Cold finished	13	14	xxxxxxx	22,603	xxx	516	-
	Hoops and baling bands	4	15	xxxxxxx	21,646	xxx	114	-
	TOTAL BARS	61	16	12,833,450	1,845,649	57.5	27,839	155,410
	Tool steel bars (rolled and forged)	17	17	106,092	13,196	49.8	46	-
	Pipe and tube—B. W.	16	18	1,839,757	258,430	56.2	6,997	-
	L. W.	11	19	1,509,534	205,946	54.6	4,666	-
	Electric weld	3	20	715,571	60,124	33.6	365	-
	Seamless	15	21	2,772,478	437,128	63.1	23,014	-
	Conduit	6	22	133,850	22,559	67.4	651	-
	Mechanical Tubing	5	23	188,800	34,363	72.8	1,307	-
	Wire rods	19	24	xxxxxxx	211,147	xxx	10,884	71,878
	Wire—Drawn	39	25	1,827,227	366,388	80.2	15,223	7,359
	Nails and staples	20	26	1,119,693	172,255	61.5	6,514	-
	Barbed wire and fence	17	27	1,193,308	132,176	44.3	10,147	-
	Bale ties	11	28	116,296	12,367	42.5	58	-
	All other wire products	7	29	113,600	6,529	23.0	43	-
	Fence posts	14	30	146,750	21,466	58.5	319	-
	Black plate	13	31	583,479	102,688	70.4	2,655	21,939
	Tin plate	15	32	2,880,870	585,073	81.2	86,348	-
	Sheets—Hot rolled	21	33	xxxxxxx	582,305	xxx	12,236	17,347
	Hot rolled annealed	23	34	xxxxxxx	582,981	xxx	18,455	506
	Galvanized	17	35	xxxxxxx	334,058	xxx	17,231	-
	Cold rolled	19	36	xxxxxxx	616,642	xxx	18,591	-
	All other	17	37	xxxxxxx	167,105	xxx	3,595	-
	TOTAL SHEETS	31	38	10,160,540	2,283,091	89.9	70,108	17,853
	Strip—Hot rolled	29	39	3,545,756	687,874	77.6	17,306	115,038
	Cold rolled	39	40	1,192,855	239,319	80.3	2,758	-
	Wheels (car, rolled steel)	4	41	348,693	49,287	56.5	1,297	-
	Axles	4	42	425,900	38,652	36.3	273	-
	Track spikes	11	43	351,060	31,639	36.0	334	-
	All other	6	44	-	64,936	-	1,936	-
	TOTAL STEEL PRODUCTS	149	45	xxxxxxx	11,347,300	xxx	403,948	1,212,829
	Estimated total steel finishing capacity based on a yield from ingots of 71.9%	-	46	47,919,500	xxxxxxx	84.6	xxxxx	xxxxxxx
	Pig iron, ferro manganese and spiegel	31	47	xxxxxxx	1,656,004	xxx	37,335	450,027
	Ingot moulds	5	48	xxxxxxx	125,901	xxx	1,507	-
Iron Products	Bars	13	49	237,019	19,998	33.7	106	210
	Pipe and tubes	4	50	185,457	18,723	40.4	216	-
	All other	4	51	113,660	7,660	27.0	900	814
	TOTAL IRON PRODUCTS (ITEMS 49 to 51)	16	52	478,176	46,381	38.8	1,222	1,024

Production

STEELMAKING capacity was engaged 89 per cent last week, off 2 points, due principally to the temporary strike situation in the Pittsburgh district.

Chicago—Increased 1 point to 84 per cent, with prospects favorable for a continuation of this rate through June, barring development of labor trouble. Thirty-one of 39 blast furnace stacks continue active.

Detroit — Unchanged at 100 per cent, although the rate will be brought down fractionally this week by one furnace of the district's 21 being down a day for roof repairs.

Central eastern seaboard—Operations continued at 73½ per cent. New orders of finished steel are tapering, but producers are endeavoring to work off heavy backlogs as rapidly as possible.

Pittsburgh—Ingot production declined 10 points to 83 per cent, as a result of the strike situation at one of the major steelworks.

Wheeling—Held steady at 94 per cent.

St. Louis—Unchanged at 94 per cent for the third consecutive week.

Birmingham—Held at 83 per cent, with no change indicated in the immediate future.

Buffalo—Two open hearths were down for repairs part of last week, causing the rate to dip two points to 90 per cent. Resumption is expected this week.

New England — With two open hearths down for minor repairs, ingot operations averaged 87 per cent, loss of three points.

Cincinnati — Continued at 94 per cent, with two open hearths idle. Needs for repairs may lower the rate soon.

Youngstown—Held at 83 per cent, with 70 open hearths, three bessemers and 21 blast furnaces active.

Cleveland-Lorain — Remained at 79½ per cent for the fourth consecutive week. Thirty-one units continue active.

FINISHED STEEL SHIPMENTS SHOW DECLINE IN APRIL

Shipments of finished steel by the United States Steel Corp. in April were 1,343,644 tons, compared with 1,414,399 tons in March, a longer month. The decline was 70,755 tons. This is the largest April shipment since 1929 when the total was 1,498,330 tons. Compared with April, 1936, the gain in shipments was 363,737 tons. For four months total shipments were 5,041,685 tons, compared with 3,161,188 tons in the same period of 1936.

District Steel Rate

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended May 15	Change	Same week 1936	Same week 1935
Pittsburgh ..	83	—10	63	38
Chicago	84	+ 1	71	51½
Eastern Pa...	73½	None	44½	28½
Youngstown..	83	None	76	50
Wheeling	94	None	89	73
Cleveland	79½	None	75½	51
Buffalo	90	— 2	75	32
Birmingham .	83	None	69	54½
New England	87	— 3	77	50
Detroit	100	None	94	94
Cincinnati ...	94	None	80	†
St. Louis	94	None	†	†
Average....	89	— 2	68½	45½

†Not reported.

Steel & Wire Lights All Cleveland Coke Ovens

American Steel & Wire Co. has brought into operation the fourth battery of ovens at its Cleveland coke plant, the first time the entire plant has been in operation in four years. The plant is being rehabilitated at cost of about $500,000. Output will be 2700 tons of coke daily, with corresponding volume of by-products and gas. Part of the coke will be consumed at the company's Central Furnaces, Cleveland, and the remainder shipped to a Youngstown, O., plant. Most of the gas will be used by plant operations. Under normal operation about 350 men will be employed, with W. R. Pendry, builder of the plant, superintendent.

Steel Barrel Production Higher, Census Reveals

Moderate increase in production of steel barrels, kegs and drums from 1933 to 1935 is revealed by a census bureau survey, recently released. Manufacturers of these steel containers employed 5753 wage earners in 1935, an increase of 1.7 per cent over 5659 employed in 1933. Wages paid increased 18 per cent from $4,950,325 to $5,839,272. Output in 1935 was valued at $33,103,464, an increase of 9.3 per cent over $30,300,608 in 1933.

U. S. STEEL CORP. SHIPMENTS
(Inter-company shipments not included)
(Tons)

	1937	1936	1935	1934
Jan.	1,149,918	721,414	534,055	331,777
Feb.	1,133,724	676,315	583,137	385,500
Mar.	1,414,399	783,552	668,056	588,209
April	1,343,644	979,907	591,728	643,009
May	.....	984,097	598,915	745,063
June	.....	886,065	578,108	985,337
July	.....	590,851	547,794	369,938
Aug.	.....	923,703	624,497	378,023
Sept.	.....	961,803	614,933	370,306
Oct.	.....	1,007,417	686,741	343,962
Nov.	.....	882,643	681,820	366,119
Dec.	.....	1,067,365	661,515	418,630
Y'rly adj.	....	.....	†23,750	†19,907
Total	.....	§10,825,132	7,347,549	5,905,966

*Addition. †Deduction. §Subject to adjustment.

Rules Against Scrap Embargo

LAST week the commercial policy committee, created by various government departments, completed its survey of the iron and steel scrap situation and will recommend to the senate military affairs committee that an embargo would be inadvisable at present.

Its report will be submitted first to the director of budget for coordination purposes, then to Secretary of State Hull for transmission to the military affairs committee.

The policy committee's recommendations will not be changed unless the President steps in, which is considered unlikely.

Representative Kopplemann, Connecticut, sponsor of a scrap embargo bill, last week told the house he had conferred with the President and found him favorable to his bill. However, any conferences between the President and Mr. Kopplemann were held before complete compilation of facts.

Dawes Sights High Steel Activity for Two Years

A high degree of prosperity for the steel industry over the next two years is predicted by Gen. Charles G. Dawes, banker and former vice president, is his book, "How Long Prosperity?"

General Dawes, who scored in predictions as to recovery over the past two years, sees a minor business recession about the second half of 1939. He bases this on the same reasoning as his earlier forecasts. A collapse of the stock market in 1939, he says, will follow the pattern of similar interruptions in the business cycle. It will be similar to those in 1884, and 1904, will last one to two years and will be followed by prosperous business.

He reiterates a previous statement that business commentators thus far have considerably underestimated the extent of coming prosperity and business activity in all lines during the next two years, especially in fundamental durable goods, including iron and steel.

Men of Industry

GEORGE E. WHITLOCK has been elected president, Mullins Mfg. Corp., Salem, O. He formerly was president, City Auto Stamping Co., Toledo, O. Henry A. Roemer, president of Pittsburgh Steel Co. and Sharon Steel Corp., has been elected chairman of the board of Mullins. Other officers include: Vice presidents, G. R. Gibson and J. P. Trice, Salem, O.; secretary-treasurer, Andrew McCloud; assistant secretary-treasurer, H. F. Wycoff.

♦ ♦ ♦

Collier Elliott, formery connected with R. H. Macy & Co. Inc., is now associated with the New York office of Peter A. Frasse & Co. Inc.

♦ ♦ ♦

John W. White has been elected president and general manager, Westinghouse Electric International Co., with headquarters in New York.

♦ ♦ ♦

Dale Cox has been appointed to take charge of public relations for International Harvester Co., Chicago. He formerly was a columnist for the *Cleveland Plain Dealer*.

♦ ♦ ♦

E. M. Levine has been appointed sales engineer in the Pittsburgh sales office of Cincinnati Milling Machine & Cincinnati Grinders Inc., located at 1207 Empire building.

♦ ♦ ♦

W. Herbert Bretzlaff, for the past four years vice president in charge of national account sales for A. E. Laboratories, has become vice president, Defiance Pressed Steel Co., Toledo, O.

♦ ♦ ♦

F. B. Hufnagel, president, Crucible Steel Co. of America, New York, has been elected chairman of the board, succeeding the late H. S. Wilkinson. He will also continue as president.

♦ ♦ ♦

J. Burton Ayers, connected with Great Lakes shipping since 1900, has been elected president and general manager, Great Lakes Steamship Co. Inc., Cleveland, to succeed the late Horace S. Wilkinson.

♦ ♦ ♦

T. D. Stewart, sales manager, L. A. Young Spring & Wire Corp., Detroit, and Alan McHenry, Bowen Products Corp., Detroit, have been elected to the board of directors of the Young company, succeeding L. H. Diehl and Charles Miller.

♦ ♦ ♦

Frank D. Illingworth has been appointed assistant to the partners of A. Milne & Co., with headquarters at 745 Washington street, New York. He also will be assistant to the president, Edgar Allen Steel Co. Inc., a subsidiary.

♦ ♦ ♦

H. O. K. Meister, heretofore assistant general manager, has been appointed general manager, Hyatt Bearings division, General Motors Corp., Harrison, N. J., to succeed the late H. J. Forsythe. He has been employed in various capacities in the Hyatt division since 1914, when he joined Hyatt Roller Bearing Co., predecessor of the Hyatt division, as assistant advertising manager. Later he was transferred to Chicago in the sales department of the Hyatt tractor and implement division; in 1920 was made sales manager of that unit, in 1925 returned to Harrison as general sales manager; in 1929 was named assistant general manager.

H. O. K. Meister

♦ ♦ ♦

J. E. McDaniels, National Tube Co., Ellwood City, Pa., has been elected president, Western Reserve Foremen's association. Other officers are Frank Schaeffer, Republic Steel Corp., Youngstown, O., first vice president; Fred Bonar, Republic Steel Corp., Warren, O., second vice president.

♦ ♦ ♦

Henry H. Seabrook Jr. has been appointed assistant to H. J. Heineman, Yarway sales representative in the Pittsburgh territory for Yarnall-Waring Co., Chestnut Hill, Philadelphia. Fred Weatherill has joined Yarnall-Waring as sales engineer in the Yarway impulse steam trap division.

♦ ♦ ♦

R. G. Adair, assistant to the works manager, Butler plant, American Rolling Mill Co., has been appointed assistant director of industrial and public relations, with headquarters in Middletown, O. Mr. Adair joined the Armco organization in 1916, as a laborer in the processing department, Middletown works.

♦ ♦ ♦

Henry K. Smith, former president, Art Metal Construction Co., Jamestown, N. Y., has been elected chairman, board of managers. Algot J. E. Larson has been advanced from vice president to president. New vice presidents are Edward A. Keeling, Carl D. Elofson, Roscoe W. Clark and Charles E. Atwood. H. T. Swanson continues as secretary-treasurer.

♦ ♦ ♦

H. O. Brumder has been re-elected president, Pressed Steel Tank Co., Milwaukee. R. P. Diekelman, vice president, has also been appointed treasurer of the company. He succeeds the late F. T. Boundy, who had been treasurer 35 years. Herman Merker has been re-elected vice president, and George G. Brumder has been named secretary.

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J. R. Heckman, for the past five years district sales manager of the Chicago district, Midvale Co., has resigned to become district manager of General Alloys Co. in the same territory. J. C. Glass, associated with Midvale for the past 17 years in the Cleveland district, succeeds Mr. Heckman at Chicago. These changes became effective May 15.

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G. R. Harris and M. H. Banta have been transferred from Jones & Laughlin Steel Corp.'s Aliquippa works metallurgical department to the new research and development division at Pittsburgh. Mr. Harris will supervise patent work and technical publicity, while Mr. Banta will supervise experimental work on steelmaking.

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L. A. Harding, Harding Carleton Co., has been elected chairman of the newly organized Air Conditioning Council of Western New York, Buffalo. Other executives of the council are Roswell Farnham, Buffalo Forge Co., vice chairman; R. H. Mollenberg, Mollenberg & Betz, treasurer; and Walter P. Davis, Buffalo Niagara Electric Corp., executive secretary.

♦ ♦ ♦

K. M. Haugen has been elected president and general manager, Schlafer's Inc., retail hardware firm, and A. A. Wettengel, has been made president of Schlafer Supply Co., wholesale and mill supply house, both located at Appleton, Wis., to fill vacancies caused by the death of O. P. Schlafer. W. D. Schlafer has been made chairman of the board, Schlafer Supply Co.

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Walter E. Camp, graduate of Washington and Jefferson college, has been appointed assistant to the

manager of public relations, Pittsburgh district, Carnegie-Illinois Steel Corp. He was employed by Carnegie Steel Co. in January, 1934, and for two years was news editor at Clairton works. John E. McGrath, a University of Pittsburgh graduate, has been appointed as Mr. Camp's successor at Clairton.

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Fred Hurst, representative of Roxalin Flexible Lacquer Co. Inc., Elizabeth, N. J., has been stationed in the Chicago area, after a year's training in the company's laboratory. He is located at 5855 North Mobile avenue, Chicago. Howard Verrault, who also has had a year's training in the laboratory, now represents the company in upstate New York territory, making his headquarters in Rochester.

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Robert B. Meneilly has been appointed assistant to C. F. W. Rys, chief metallurgical engineer, Carnegie-Illinois Steel Corp., Pittsburgh. He received the degree of master of science in metallurgy at Carnegie Institute of Technology in 1930 and in the same year entered the employ of American Can Co., Chicago, as supervisor of metals, investigations, research department. He is a member, American Society for Metals and American Society for Testing Materials.

♦ ♦ ♦

W. A. Haven, vice president, Arthur G. McKee & Co., Cleveland, sailed recently for England, accompanied by K. A. Barren and J. H. Sharp of that company's engineering organization. He will return after a brief visit while Mr. Barren and Mr. Sharp will remain as resident engineers in connection with the design and construction of two blast furnaces for the Appleby-Frodingham Steel Co. Ltd., Scunthorpe, Lincolnshire, contract for which recently was booked by the McKee company.

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C. A. Strand, president of Stran-Steel Corp. since its formation in April, 1933, as a subsidiary of Kelsey-Hayes Wheel Co., has been made general manager of the former company which recently was acquired by Great Lakes Steel Corp., Detroit. K. A. Dietrich has been named assistant general manager and director of sales and advertising for the Stran-Steel division. J. A. Clauss, chief engineer for Great Lakes, will be in charge of engineering for Stran-Steel and he will be assisted by Ivar Barclay.

♦ ♦ ♦

O. W. Young, general superintendent, Buick Motor division of General Motors Corp., Flint, Mich., has been promoted to the new post of assistant manager of manufacturing. Other promotions follow: J. G. Hammond, from superintendent of special transmissions to general superintendent; Walter N. Larke, from superintendent of the engine factory to main office special assignment; Fred W. Letts, from assistant superintendent to superintendent of engine factory; Bruce Fonger, from night superintendent to assistant superintendent of engine factory; R. W. Warnock, from general foreman to superintendent of special transmissions; and Vern E. VanSaw, general foreman in the engine plant, to assistant superintendent of special transmissions.

Died:

SAMUEL L. BUCK, 64, vice president and director, Taylor-Wharton Iron & Steel Co., Highbridge, N. J., in Somerville, N. J., May 11. Born in Weatherly, Pa., he has been with the company 37 years, the last ten as a director and vice president.

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Albert L. Sessions, president, J. H. Sessions & Son, Bristol, Conn., in that city, April 29.

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L. F. Jackson, 58, contracting engineer in the structural division, Bethlehem Steel Co., Philadelphia, at his home in Upper Darby, near Philadelphia, May 1.

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John Christensen, 67, president, Cincinnati Gear Co., May 10 while aboard liner on way to coronation in London. He is a former president, American Gear Manufacturers association.

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Gideon R. Gagne, 46, chief engineer, Snap-On Tool Co., Kenosha, Wis., in that city, May 9. Before going to Kenosha in 1930 he was a tool designer for Allis-Chalmers Mfg. Co., A. O. Smith Corp. and Kearney & Trecker Corp.

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Peter S. Duncan, 85, prominent in the refractories field, May 4 at Hollidaysburg, Pa. He was the founder, Standard Refractories Co., later merged with General Refractories Co., and was also an organizer of the Keystone Carbonic Gas Co., Harrisburg, Pa.

Industrial Research Directors Visit Homestead Works

MEMBERS of the National Association of Directors of Research were guests May 5 of Dr. John Johnston, New York, director of research, United States Steel Corp., on a visit to the Homestead works of Carnegie-Illinois Steel Corp. They were in Pittsburgh to attend the formal opening of the Mellon Institution of Industrial Research (STEEL, May 10, p. 25.) The group includes:

H. D. Batchelder, National Carbon Co.; F. M. Becket and C. M. Curme, Union Carbide & Carbon Corp.; E. K. Bolton, DuPont Co.; F. C. Breyer, Singmaster & Breyer; O. E. Buckley and M. J. Kelly, Bell Telephone Laboratories; E. H. Bunce, New Jersey Zinc Co.; H. P. Charlesworth and F. B. Jewett, American Telephone & Telegraph Co.; E. Claxton, Armstrong Cork Co.; J. V. N. Dorr, Dorr Co.; E. A. Eckhardt and P. D. Foote, Gulf Oil Corp.; F. C. Frary, Aluminum Co. of America; J. R. Freeman, American Brass Co.; W. A. Gibbons, United States Rubber Co.; John Johnston, United States Steel Corp.; G. S. Mathey, Johnson & Johnson; C. E. K. Mees, Eastman Kodak Co., and guest, E. C. Williams; C. E. Skinner and T. E. Spooner, Westinghouse Electric & Mfg. Co.; E. A. Taylor, Grasselli Chemical Co.; J. G. Vail, Philadelphia Quartz Co.; A. J. Wadhams, International Nickel Co.; A. J. Weith, Bakelite Corp., and R. T. Major, Merck & Co.

Meetings

WAREHOUSE ASSOCIATION LISTS CONVENTION SPEAKERS

DR. JAMES S. THOMAS, president, Chrysler Institute of Engineering, Detroit, and Clarkson College of Technology, Pottsdam, N. Y. Whiting Williams, industrial consultant, author and lecturer, Cleveland; G. Wright Hoffman, professor of markets and prices, Wharton School of finance and commerce, University of Pennsylvania, Philadelphia; and an internationally prominent steel expert and trade authority, will speak at the twenty-eighth annual convention of the American Steel Warehouse association, May 24-26, at White Sulphur Springs, W. Va.

A plan for analyzing warehouse costs will be presented. Another feature will be a summarized statement of the principles of secondary steel distribution. Chairmen of the association's commodity committees will discuss conditions surrounding marketing.

Social events on the program include a banquet on May 25 and golf tournaments. W. S. Doxsey, 442 Terminal Tower, Cleveland, is executive secretary of the association.

BOARD OF PRESSURE VESSEL INSPECTORS PLAN MEETING

National Board of Boiler and Pressure Vessel Inspectors will hold its eleventh general meeting at Hotel McAlpin, New York, May 24-26. The board was organized in 1919 to obtain uniform approval of specific designs of boilers and pressure vessels through adoption by states and cities of one code of rules.

Major changes in design and construction and design of boilers and pressure vessels and new materials contemplated for use are topics embraced in the meeting program. Among specific topics are welding of ferrous and nonferrous metals, nondestructive inspection and operating problems. An exhibit to be held in connection with the meeting will present examples of sound and defective welding, failures in operation, design and construction.

Sessions will be held morning and afternoon of the three days. C. O. Myers, 1105 Brunson building, Columbus, O., is secretary of the board.

OPEN-HEARTH GROUP WILL CONVENE IN MIDDLETOWN

Second meeting of the Cincinnati section of the Open-Hearth committee, American Institute of Mining and Metallurgical Engineers, will be held at the Manchester hotel, Middletown, O., May 19. The program calls for morning and afternoon sessions, a luncheon and a dinner. All discussions will be informal and will deal principally with melting practice, mold coatings and furnace maintenance. In the afternoon, an inspection tour will be made to the East Side works of the American Rolling Mill Co.

MACHINE TOOL DEALERS TO HOLD MEETING IN JUNE

Spring meeting of the Associated Machine Tool Dealers is to be held at Skytop Lodge, Skytop, Pa., June 14-15. H. R. Rinehart, 505 Arch street, Philadelphia, is executive secretary of the organization.

Convention Calendar

May 17-21—American Society of Mechanical Engineers. Semiannual meeting at Statler hotel, Detroit. C. E. Davies, 29 West Thirty-ninth street, New York, is secretary.

May 17-21—American Mining congress. Fourteenth annual coal convention and exposition at Music Hall, Cincinnati. Julian D. Conover, Munsey building, Washington, is secretary.

May 17-21—National Electrical Manufacturers association. Spring conference at the Homestead, Hot Springs, Va. W. J. Donald, 155 East Forty-fourth street, New York, is managing director.

May 23-27—National Electrical Wholesalers association. Twenty-ninth annual convention at the Homestead, Hot Springs, Va. E. Donald Tolles, 165 Broadway, New York, is secretary.

May 24-25—American Gear Manufacturers' association. Twenty-first annual meeting at Galen Hall hotel, Wernersville, Pa. J. C. McQuiston, Penn Lincoln hotel, Wilkinsburg, Pa., is manager-secretary.

May 24-26—American Steel Warehouse association. Twenty-eighth annual convention at Greenbrier hotel, White Sulphur Springs, W. Va. Walter S. Doxsey, 442 Terminal Tower, Cleveland, is secretary.

May 24-26—National Board of Boiler and Pressure Vessel Inspectors. Eleventh general meeting at Hotel McAlpin, New York. C. O. Myers, 1105 Brunson building, Columbus, O., is secretary.

May 24-27—National Association of Purchasing Agents. Twenty-second annual convention at William Penn hotel, Pittsburgh. George A. Renard, 11 Park Place, New York, is secretary.

May 27—American Iron and Steel institute. Forty-sixth general meeting at Waldorf Astoria hotel, New York. Walter S. Tower, 350 Fifth avenue, New York, is executive secretary.

May 27-28—National Metal Trades association. Thirty-ninth annual meeting at Palmer House, Chicago. Harry S. Flynn, 122 South Michigan avenue, Chicago, is secretary.

June 1-3—American Society of Refrigerating Engineers. Twenty-third spring meeting at French Lick Springs hotel, French Lick, Ind. David L. Fiske, 37 West Thirty-ninth street, New York, is secretary.

June 8-10—National Warm Air Heating and Air Conditioning association. Mid-year convention at Hotel Cleveland, Cleveland. Allen W. Williams, 50 West Broad street, Columbus, O., is secretary.

June 11-12—Gray Iron Founders' society. Annual meeting at Hotel Cleveland, Cleveland. W. W. Rose, 33 Public Square building, Cleveland, is executive vice president.

June 14-15—Associated Machine Tool Dealers. Spring meeting at Skytop Lodge, Skytop, Pa. H. R. Rinehart, 505 Arch street, Philadelphia, is executive secretary.

June 16-23—Railway Supply Manufacturers' association. Convention and exhibition at Municipal Auditorium, Atlantic City, N. J. J. D. Conway, 1941 Oliver building, Pittsburgh, is secretary.

June 21-24—National Association of Cost Accountants. Eighteenth annual convention at the Homestead, Hot Springs, Va. Stuart C. McLeod, 385 Madison avenue, New York, is business manager.

June 21-24—American Society of Agricultural Engineers. Annual meeting at University of Illinois, Urbana, Ill. Raymond Olney, Saint Joseph, Mich., is secretary.

June 21-24—National Association of Credit Men. Forty-second annual convention at Stevens Hotel, Chicago. Brace Bennitt, 1 Park avenue, New York, is convention director.

June 23-26—Sixth International Congress for Steel Development in Paris, France. Headquarters of congress are at the Hague, Netherlands.

June 24-26—American Society of Heating and Ventilating Engineers. Semi-annual convention at New Ocean House, Swampscott, Mass. A. V. Hutchinson, 51 Madison avenue, New York, is secretary.

June 28-July 2—American Society for Testing Materials. Fortieth annual meeting at the Waldorf-Astoria, New York. C. L. Warwick, 260 South Broad street, Philadelphia, is secretary.

Switchgear Equipment Exhibit Tours Key Cities

Recently developed switchgear equipment features a traveling exhibit now touring various industrial centers under sponsorship of General Electric Co., Schenectady, N. Y. Exhibit is transported by truck and is set up in hotel display rooms to which industrial and transportation executives are invited.

Exhibit opened in the Ambassador hotel, New York, May 3. Other cities on the itinerary include Newark, N. J., New Haven, Conn., Hartford, Conn., Albany, N. Y., Syracuse, N. Y., Rochester, N. Y., Buffalo, Binghampton, N. Y., Erie, Pa., Cleveland, Cincinnati, Columbus, O., Fort Wayne, Ind., Toledo, O., Akron, O., Canton, O., Detroit, St. Louis, Milwaukee, Omaha, Nebr., Kansas City, Mo., Indianapolis, Ind., Atlanta, Ga., and Birmingham, Ala.

Models of metal clad equipment are utilized to show features of mechanical interlocking and factory assembled units. Emphasis is placed on the oil blast principle of circuit interruption in oil-circuit-breakers, and on silver contacts and modern arc-quenching devices in air-circuit-breaker design. A stage setting with elevated turn table and illuminated shadow boxes is used to display equipment. General Electric demonstrators accompany the show.

Activities of Steel Users and Makers

AFRICAN METALS CORP., New York, has been appointed exclusive sales representative for the steel products sold in the United States east of the Rocky mountains, by the Societe Commercials d'Ougree which is in charge of sales for all products manufactured by the Ougree-Marihaye steel works, located in Belgium, Luxemburg and France. Among the products are hoops and bands, cotton ties, wire rods, special and light shapes, window sections, merchant bars, plates, black and galvanized sheets.

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Ex-Cell-O Aircraft & Tool Corp., Detroit, at recent meeting of shareholders, amended its articles of incorporation, changing the corporate name to Ex-Cell-O Corp.

♦ ♦ ♦

Joseph T. Ryerson & Son Inc., Chicago, has moved its office from the Continental Illinois Bank building to 1013-15 First National Bank building.

♦ ♦ ♦

C. O. Bartlett & Snow Co., Cleveland, has removed its office in New York to room 404-E, 30 Church street. C. W. Ross is district manager.

♦ ♦ ♦

Republic Steel Corp., Cleveland, has appointed Huey & Philp Hardware Co., with warehouses in Dallas and Houston, Tex., and Star Steel Supply Co., Detroit, distributors of Enduro stainless steel.

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Allis-Chalmers Mfg. Co., Milwaukee, has opened an office in the National Bank building, Knoxville, Tenn., in charge of W. C. Johnson. The office will operate as a branch of the company's Chattanooga district office, of which D. S. Kerr is manager.

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Ohio Seamless Tube Co., Shelby, O., is installing equipment for manufacture of electric welded tubing, scheduled to go into operation June 1. It also has installed a controlled atmosphere furnace to improve quality of product, particularly aircraft tubing.

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Van Huffel Tube Corp., Warren, O., has completed addition increasing manufacturing space to about 100,000 square feet. Company produces full line of lock joint, butted and welded tubing, metal products used in buildings and complete line of metal card tables and chairs.

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Rochester Gas & Electric Corp.'s Koppers-Thylox plant at its coke oven and water gas generating station, Rochester, N. Y., will be modernized. Daily capacity is 20,000,000 cubic feet. Construction will begin in about six weeks.

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Hetz Construction Co. Inc., Niles, O., has purchased the malleable iron plant of the Warren Tool Corp., Warren O. It plans to salvage or scrap certain portions of the plant and save the remainder for use as a storage yard for salvaged materials, tools and equipment, as well as scrap materials.

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Gar Wood Industries Inc., hoist and body division, Detroit, has appointed following distributors: Iowa Spring & Body Co., Des Moines, Iowa; Granite Alaska Garage, Butte, Mont.; Neil's Automotive Service Co., Kalamazoo, Mich.; Mason & Holsinger Co., Johnstown, Pa.

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Plant, business and all commercial liabilities of Maine Steel Products Co., South Portland, Me., have been purchased by Maine Steel Inc., recently incorporated. President and treasurer of Maine Steel Inc. is G. C. Soule, who was associated with the former company since he started as superintendent's clerk 31 years ago.

♦ ♦ ♦

Contracts for modernizing two liquid purification plants have been awarded to Koppers Co., engineering and construction division, Pittsburgh. Hudson Valley Fuel Corp.'s purification plant at its coke oven gas plant in Troy, N. Y., will be changed over to the Koppers-Thylox process, and capacity increased from 18,000,000 to 24,000,000 cubic feet a day.

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Linde Air Products Co., unit of Union Carbide & Carbon Corp., New York, has opened a new Linde oxygen plant on Powhattan avenue, Essington, Pa., near Philadelphia, and a new prest-o-lite acetylene plant at 2330 Armistead Bridge road, Norfolk, Va. This brings the total number of oxygen and acetylene plants throughout the United States to 70 and 53, respectively.

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Patterson Foundry & Machine Co., East Liverpool, O., has opened a new office at Pittsburgh, located in the Bessemer building. D. M. Wilhelm, connected with the Patterson company for many years, first in the production department and then in charge of sales at New York, is in charge. An engineering department will be maintained at Pittsburgh, as well as a district purchasing department.

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C. C. McKallip & Co. has been appointed to sell the property and assets of Pressed Steel Car Co. at Koppel, Pa., valued at several million dollars. The Koppel plant was closed about two months ago and its activities transferred to the parent company's McKees Rocks plant.

Included in the offering are 50 single-family houses, 50 apartments, a club house, a hotel building, a bank building, 500 lots on improved streets, industrial buildings served by railroad sidings, and boiler and power plants.

More "Pay Dirt" with High Tensile Steel

REDUCTION in weight of road equipment, plus increased durability and strength, has been accomplished by Gar Wood Industries Inc., in this 10-yard scraper. With the use of Youngstown Sheet & Tube Co.'s Yoloy, a nickel copper, high tensile steel, weight of the machine was reduced from 18,500 to 13,500 pounds. This is equivalent to two cubic yards of pay dirt. The machine's hauling wheelbase is 13 feet, 9 inches long, and equipped with heavy-duty hydraulic hoists it can dig, haul and spread over 800 yards of dirt in eight hours

Millions In Power Tools For Craftsman Hobbies

WOOD and metal working—one of the earliest trades of civilization—is providing one of today's most popular hobbies.

Development of the home workshop movement the past ten years has been rapid, particularly since about 1930. Instead of retarding its growth, the depression stimulated interest in the home shop. As a consequence, a sizable business now exists in the supplying of tools, equipment and material to the many individuals who are deriving pleasure and profit from this avocation.

The home workshop, of course, has been in existence for many years, but it was not until equipment manufacturers offered tools designed primarily for home use and various agencies promoted interest in the movement that its popularity began to assume major proportions.

Publications have helped to encourage home craftsmanship, some being devoted solely to this subject. Daily papers in certain cities feature a home workshop department. Fisher Body Craftsman's Guild, since 1930 an undertaking of Fisher Body division of General Motors Corp., has aroused the idea in minds of hundreds of thousands of boys between the ages of 12 and 19 with its annual coach building competition.

The National Homeworkshop Guild has been an important factor in boosting the movement. This guild was organized in 1933 with headquarters in Rockford, Ill., where a club had been formed the previous year to exchange ideas, conduct helpful programs and demonstrations, and to foster a wider interest among the people of the city in useful employment of spare time. Supported by *Popular Science Monthly*, which was chosen as the guild's official organ, the idea met with hearty response from home craftsmen throughout the country. Today there are clubs in 43 states, Canada and the Philippines. More than 100 new clubs were organized last year and the 200 additional expected to be added in 1937 will bring the total over 400. The guild is noncommercial, making no charge for membership. It issues a monthly bulletin, provides speakers, movies and craftwork instruction. Headquarters are 347 Fourth avenue, New York.

Estimate Million Workshops

Some estimates place the total number of home workshops as high as 1,000,000. The number equipped with power tools, however, probably is less than half this figure but is growing steadily. Fisher Body Craftsman's Guild has a membership of more than 1,250,000 and while the majority of these boys do not have their own shops, they represent potential buyers of home shop equipment at some future date. Incidentally, the Fisher guild this year, in addition to its coach building contest, is sponsoring a similar competition with identical cash and scholarship prizes for building of models of original motorcar designs.

Probably the most interesting feature of the home shop worker is that he may come from almost any walk of life and may be following any one of a variety of vocations. Like golf, the craftsman "bug" bites indiscriminately. Bank and industrial executives, opera and movie stars, salesmen, professional men, mechanics and laborers are numbered among the ranks of the home shop operators.

Average Equipment

Some enlightening information on this hobby follower is contained in a survey conducted recently among members of the National Homeworkshop Guild. This revealed that his average age is 35; less than 20 per cent of the individuals checked were more than 47. His education is better than average; it is almost a one-to-two chance that he went to college. More often than not, he has never worked in a skilled trade.

It is likely that his shop is in the basement and has been operated an average of five years. His shop includes five machines and about 50 hand tools. His average investment for machines is $100 and for hand tools $90. He spends $128 each year for material and miscellaneous supplies, including $25 for tools and $15 for hardware. Recreation is his principal reason for maintaining the shop, this being the response of 70 per cent of the replies to the survey. Of the remainder, 26 per cent indicated the reason was partly for profit and 4 per cent mainly for profit. He spends an average of 11½ hours a week in his shop.

Wood-working tools are the principal ones to be found in the average home workshop. This same survey showed that 68 per cent of the shops had a wood turning lathe, 63 per cent had a circular saw, 62 per cent a jig saw, 57 per cent a tool grinder, 41 per cent a drill press, 35 per cent a sander, 32 per cent a jointer, 24 per cent a band saw and 21 per cent a shaper. Only 12 per cent included a metal turning lathe.

Growth of home craftsmanship has been a boon to some tool builders. Best illustration of this is the development of the Delta Mfg. Co., Milwaukee, largest manufacturer of small power tools. Thirteen years ago it was a small mail-order company engaged in selling scroll saws;

TYPICAL is this basement workshop of Louis Allis, Milwaukee electric motor manufacturer, equipped with small lathes, drill presses, saws, and other power and hand tools. Photo courtesy Delta Mfg. Co., Milwaukee

today it has a large line of power tools and accessories, distributed nationally through retailers.

Prior to 1924 there were few motor-driven machines available to homecrafters. The small-size woodworking tools on the market were comparatively high in price and were not designed for home use, nor did they find sales in that direction. In 1924 the Delta company introduced a scroll saw intended for the home user. Retailers of larger tools used in production shops were not interested in handling the equipment and it was necessary to sell direct by mail.

Additional tools were developed and the business expanded steadily, finally reaching the point where it became desirable to establish retail outlets. Success of the home market for tools had become apparent by that time, and many retailers were eager to sell such equipment. Through prosperity and depression, Delta for 13 consecutive years has reported increased sales.

Here is one industry that turned hard times into good business. Individuals, either with more leisure time or entirely out of work, turned to workshops in increasing numbers during the early 1930's. Here many found an opportunity to set up their own business and licked unemployment in that fashion. Schools also provided a more active market during the depression when budgets were pared and purchase of lower priced tools was necessary. Not being able to afford big machines, manual training and vocational shops bought smaller power tools developed for home shops and found them better adapted than the larger equipment.

Large Industrial Shops Are Buyers

Another interesting outcome of home tool development is the manner in which large industrial shops have become buyers of these machines. This trend also was aided by the depression since prices of home tools were relatively low. Companies first bought them to save on initial cost, but discovered that their construction and the quality of work produced by them were comparable with those of larger and more expensive tools. The industrial market consequently has continued to expand, until now a large proportion of the machines manufactured by the Delta company are sold to industrial users, and several Delta machines are designed solely for production work.

South Bend Lathe Works, South Bend, Ind., has helped to popularize its 9-inch "Workshop" lathe by cultivating the homecraft market. This small member of the South Bend line is adapted both in size and price to the home shop, as well as being used for the production of small accurate parts in the manufacturing plant, tool room or laboratory. To assist operators the company issues bulletins covering the use of the lathe in various operations and also offers practical machine shop projects. The latter include drawings, job sheets and necessary rough castings, steel and hardware for manufacture of a variety of products ranging from simple hand tools to gasoline engines and other types of machines.

It is not surprising that manufacturers of home workshop tools have found it desirable to incorporate good design in their products. Often the home craftsman is inexperienced and is inclined to expect too much of his equipment whereas a skilled workman is familiar with a machine's limitations and will operate it accordingly. The former also is more outspoken than the latter regarding design and supposed defects of his tools, but sometimes in this respect he becomes helpful in suggesting improved design.

Investment Is Small

Considering quality of the machines, investment necessary to equip a home workshop capable of turning out a wide variety of products is small, as indicated by the guild survey figures. For about $30 the home craftsman can purchase a four-speed, 11-inch lathe and for $18 additional can equip it with a compound slide rest for metal turning. An 8-inch circular saw will cost him $33, while a 10-inch band saw or a 24-inch scroll saw $20 to $30. Jointers sell for $25 to $45 and drill presses from $25 up. These prices do not cover the motors or separate stand, if desired, for each machine. Hand tools, of course, also are extra.

The well-equipped shop will contain at least a circular saw, or preferably a combination saw and jointer, a lathe and drill press. The 8-inch saw, or 8-inch saw with 4-inch jointer, is the most popular size. A lathe with 11-inch swing and measuring at least 36 inches between centers is large enough for the average shop. Four speeds between 900 and 3400 revolutions per minute usually suffice. The drill press is a valuable tool, being used for routing, carving, grinding, sanding and mortising in addition to simple boring operations. For average purposes, a unit drilling to the center of an 11-inch circle, taking drills up to ½-inch and having a table travel of 36 inches or more, is required.

400 Attend Advanced Arc Welding Design Course

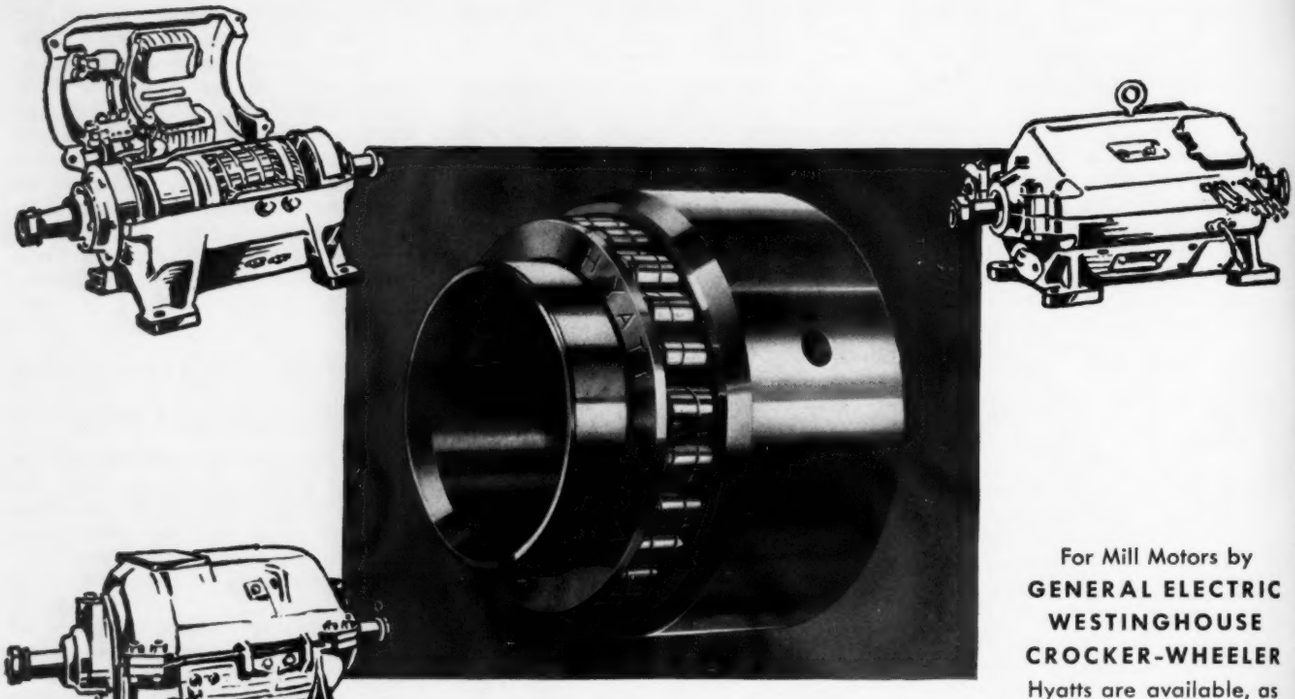
Attesting an increasing interest in electric welding, approximately 400 men attended a five-day advanced course in arc welding design and practice sponsored in Pittsburgh recently by the Lincoln Electric Co., Cleveland.

Representing many branches of industry, the course attracted steel fabricators and erectors, engineers, designers, architects, production executives, maintenance superintendents and welding supervisors and foremen.

Sessions were directed by E. W. P. Smith, Cleveland, and included papers and practical demonstrations by other welding authorities.

LARGE market possibilities for small machinery are offered by the rapidly growing popularity of home workshops. Photo courtesy South Bend Lathe Works

IT'S A TOUGH LIFE



For Mill Motors by
GENERAL ELECTRIC
WESTINGHOUSE
CROCKER-WHEELER
Hyatts are available, as standard equipment, or for change-overs.

...but they don't weaken!

• Mill motors Hyatt protected, instead of equipped with sleeve bearings, eliminate burnt-out bearings and armature troubles caused by oil-soaked windings. For general purpose motors, too, there is a type of Hyatt Roller Bearing to carry the load.

Under gruelling operating conditions today, excessive wear and stress is imposed, which would easily make ordinary bearings old before their time!

But Hyatt Bearings are designed to withstand these strains and shocks. And built by master craftsmen to a double standard of precision and long life—Hyatt capacity and performance give many added years of service to related parts.

That's why you will find so much operating equipment with Hyatt Roller Bearings built in. Hyatt Bearings Division, General Motors Corporation, Newark, Detroit, San Francisco. Hyatt Roller Bearing Sales Company, Chicago and Pittsburgh.

HYATT
ROLLER BEARINGS

MIRRORS OF MOTORDOM

DETROIT

POINTING now for the New York show and the debut of 1938 models scheduled for Oct. 27, two weeks earlier than last year, the automobile industry is accelerating on new model plans while production lines continue to drop off cars at peak pace. At some 140,000 cars per 5-day week, plants are believed to have about reached the upper limit of production for this spring, although a generous backlog of unfilled orders plus continued fair demand for cars in most localities may make the descent into summer less precipitate than normally.

More and more it appears changes on 1938 models will be fewer than originally planned, the emphasis, with few exceptions, going on the appearance or decorative side, rather than on important style or mechanical changes. Hardware, trim, moldings and other more or less minor parts of cars will come in for redesign, while bodies, engines and similar essentials will be glossed over without much alteration. Still in the forefront of possible mechanical changes, however, is the proposed automatic transmission which Buick and Oldsmobile are contemplating. It seems more than likely some use will be made of this development next year, even if only optional or on certain models.

As example of what has happened in more than one instance to projected die programs for 1938, General Motors divisions have sliced such work by over 50 per cent. This is not a recent development, but followed close on the heels of labor trouble earlier this year. Other builders are reported to have made similar reduction, all of which has been bad news to local tool and die shops.

The latter, with costs averaging 12 to 20 per cent higher than out-of-town shops, already have seen a number of die programs go out of Detroit and now face additional burden of higher labor costs resulting from the agreement made with the United Automobile Workers union.

BY A. H. ALLEN
Detroit Editor, STEEL

In this regard, talk is heard of an alliance between a number of eastern and midwestern die shops, to the end that work can be allocated to the proper locality to avoid possible labor tie-ups in another district. No information is yet available as to what companies are involved in this proposed set-up.

IT IS generally conceded an important trend in next year's models will be the increased use of molded plastics on both exteriors and interiors. For the past two years or so, plastics have had the call on many models for door handles, dash knobs, window lifts and other parts where their warmth to the touch and pleasing appearance would add to sales appeal. So popular has been their reception that studies are being made of other applications. At least two car builders are looking into the matter of using translucent molded plastics for entire instrument panels. With such an arrangement the entire panel, from side to side, would be a single molding, probably set in a steel or die cast frame, and by proper arrangement of lights, would give a striking effect to the dash.

New developments in plastics include transparent molded materials, and designers are experimenting with new effects possible by use of these materials. Some plastic hardware is molded around a steel insert or a die cast insert; wider use of this product is probable.

Steel stands to lose to a certain extent by the trend to plastics. For example, one change might be the substitution of molded plastic for plated stainless steel trim work. Plastic instrument panels would supplant steel stampings, or, in the case of Cadillac, a die casting. Tonnage loss would not be appreciable, however, and when the novelty of plastics has passed, their continued use will be doubtful. But at the moment, car builders are quick to snatch at any idea which will provide something different to talk about on new models, something to feature in coming sales messages, besides higher prices. And plastics seem to provide a plausible answer to this need. The trend will bear watching.

One important advantage of plastics is that they require no finishing work, being supplied by the producer ready for installation. Even such details as inserting metal rings in some types of dash knobs are attended to by the plastics supplier; all the builder needs to do is to truck the parts to the assembly line.

MOVING the fall automobile show forward two weeks confirms earlier reports certain new models were going to be ready by late August, and suggests current runs may be concluded earlier this year. Parts releases are now being received through June; by that time, it is felt, an appreciable tapering off in production will be scheduled. Ford, for example, will have completed 1,000,000 cars on the present series and will be well into the additional 125,000 for which material has been bought. It remains to be seen whether public purchasing power will hold strong on into the summer or whether, as many suspect, it will wane.

Builders are intent on building up strong dealers' stocks for the summer, to avoid getting caught short of cars when the change to new models is made.

At this point, two phases of the fall show appear worthy of comment. One is the plan to devote an entire floor to trailer exhibits. Clarence Budington Kelland to the contrary, the trailer fad is slowly being metamorphosed into a national pastime and builders are laying grandiose plans for promoting new sales of these portable homes.

A second feature will be reappear-

MIRRORS OF MOTORDOM

ance of Hupmobile models, after an hiatus of about 18 months. Hupp officials see possibility of moving 15,000 cars in the 12 months starting with September and already are privately showing plaster models of six and eight cylinder cars which will be in production well ahead of show time. The six will retail for about $1000 and will be on a 122-inch wheelbase, moderately streamlined, with steel top and some innovations as yet unrevealed.

The plant here has 1,400,000 square feet of floor space and is fully equipped to turn out an estimated 70,000 cars a year. Working capital of $2,600,000 is now claimed to be in the bank, and a skeleton force is at work putting through a batch of 500 old-model cars which were in process at the plant when production was halted due to financial apoplexy. These cars are all for export shipment, and it is said over 100 foreign distributors in various parts of the world are clamoring for them.

The eight-cylinder car, which will retail at about $1250, will comprise less than 10 per cent of projected production. An advertising agency has been at work for about three weeks laying groundwork for expanding dealer organization. Retail sales program will not be under way for about two months. William B. Mayo, for 19 years chief engineer for Ford and retired for the past five years, has been retained by Hupp as chief consulting engineer.

Eyeing the remarkable success Packard has achieved with its 120 model and the new six, the Hupp has been inserted in this price class and will be competitive with Packard models.

FORMAL opening of the new $5,575,000 Linden, N. J., General Motors assembly plant has been scheduled for May 27 with appropriate ceremonies. Designed along lines of the corporation's West Coast assembly plant, the new unit fits in with the present policy of decentralization and will be capable of assembling approximately 120,000 Buicks, Olds and Pontiacs, about evenly divided between the three. The plant comprises four buildings with floor space of 1,000,000 square feet.

Contrary to rumors, the new Ternstedt hardware division will not be located at Rochester, N. Y., where General Motors has a 66-acre tract for a new plant. Decision on the Ternstedt location has not been made. The Rochester plant, for which no definite name has been evolved, will provide 400,000 square feet for manufacture of starters, oil filters, air cleaners, generators, brake equipment and engine accessories, to supply eastern divisions of the corporation at Buffalo, Baltimore, Tarrytown, Atlanta and Linden. Contracts have not been let on buildings and equipment, but plans are being made to have the unit in production by January, 1938. Employment will be given about 3000.

These new projects are a part of GM's $40,000,000 expansion program which, among other things, is calculated to boost Chevrolet's capacity by 1000 units per day. Currently Chevrolet is narrowing gap which separates it from the Ford rate of 7000 cars daily, but for first four months of this year is far behind Ford assemblies—over 200,000 as a matter of fact.

Decision is understood to have been reached on the proposed Chrysler expansion at Buffalo, mentioned here last week. The new plant will be devoted to transmission manufacture and contracts will be let soon for buildings and equipment, on land now available.

Automobile Production

Passenger Cars and Trucks—United States and Canada
By Department of Commerce

	1935	1936	1937
Jan.	300,335	377,306	399,426
Feb.	350,346	300,874	383,540
March	447,894	438,992	518,715
April	477,059	527,726	†558,320
4 Mos.	1,575,624	1,644,898	†1,860,001
May	381,809	480,571	.....
June	372,085	469,355	.....
July	345,297	451,474	.....
Aug.	245,075	275,951	.....
Sept.	92,728	139,785	.....
Oct.	280,316	229,989	.....
Nov.	408,550	405,702	.....
Dec.	418,317	519,132	.....
Year	4,119,811	4,616,857	.....

Calculated by *Cram's Reports*

Week ended:	
April 17	125,472
April 24	*133,164
May 1	139,475
May 8	141,525
May 15	141,892

*Revised. †Estimated.

	Week ending May 15	May 8
General Motors	55,510	56,550
Ford	35,900	35,875
Chrysler	31,250	32,000
All others	19,232	17,100

LABOR trouble flared up at the Saginaw malleable iron division and Chevrolet gray iron foundry of General Motors at Saginaw, Mich., early last week when 500 walked out at the former and 1000 at the latter plant. Of brief duration, the disturbances were sponsored by UAW organizers as protest against piecework pay rates instead of flat rates. Organizers said production at the malleable iron division has been slowed down to 40 tons per hour from 50-55 tons, resulting in shorter earnings. They demanded production be stabilized at the higher rate.

This brings up the interesting question as to what union members will do when the company is compelled by production requirements to step down operations. Certainly the company cannot be coerced into holding production at artificially high levels when there is no need for output, but such apparently is the UAW demand.

The situation at the Chevrolet foundry was complicated by a split in the ranks of the UAW Saginaw local, which may be the explanation behind other recent brief strikes there. The first UAW organizer in the territory was dismissed and a new man sent in to replace him. The new man has been derided lustily at numerous union meetings and friction has developed. The strike last week developed initially without benefit of either organizer.

June 11 is a date being marked with a red circle on calendars in GM plants. Sixty days in advance of expiration of agreement made by the corporation and the UAW, it is the date by which either party must demand change or abandonment of the compact. It is felt the union may present a new set of demands, including petition for an election under terms of the Wagner act. UAW leaders are considerably fired by their success at Packard, and foresee a similar result in GM plants.

In Pontiac, the UAW has threatened a sitdown strike in rented houses as a protest against what are termed exorbitant rental rates. In a paid newspaper advertisement, the UAW threatened to cease paying rents June 1 unless rates were reduced to a monthly figure amounting to 1 per cent of assessed valuation of property.

WINDOWS OF WASHINGTON

BY L. M. LAMM
Washington Editor, STEEL

WASHINGTON

A SUBCOMMITTEE of the executive committee on commercial policy, which has been preparing a report on the Swellenbach scrap export bill, last week made an adverse report to the full committee and if the latter takes the advice of its subcommittee, which is fully anticipated, an adverse report will go to Senator Swellenbach and the senate military affairs committee.

A story is going the rounds that the war and navy departments, on the basis of national defense, are in favor of the suggested embargo by congress, but a thorough check indicates that up to this time no such written statement has been sent to any member of congress.

On the other hand, it is felt here in the best informed circles that Secretary of State Hull is the key man in the whole situation, and it is known that both he and Secretary of Commerce Roper oppose the proposed embargo.

It is possible, of course, that members of congress will not take any stock in what the policy committee or the secretaries of state and commerce have to say, and might proceed with such legislation, but it would not be quite the natural thing to do, especially since experts have gone into this matter carefully from every angle.

Rumor of Wider Range

A story has been circulating for the past week or so that someone, the rumor does designate who, is trying to have this proposed embargo bill increased to include nonferrous metals and even finished steel. However, there has been no move in this direction up to this time.

It is known that Governor Brann has been busy recently. He has had conferences with both Secretaries Hull and Roper and with various members of the policy committee. The story is that he got little comfort out of any of them.

The scrap bill of Senator Schwellenbach took a new turn last week, when Senator Austin, Vermont, introduced a new joint resolution, which he proposes as "an amendment" to the Schwellenbach bill and in which he strikes out all after the enacting clause and inserts an entirely new bill. Senator Austin's office apparently is not anxious to say just how he happened to introduce the resolution but it is assumed that it was at the request of the Brann group or someone who had it done for that group.

The resolution, which has been referred to the senate committee on military affairs, is as follows:

"Sec. 1. That in the interest of national defense, and for the conservation of natural resources, it is hereby declared to be the policy of congress and the purpose and intent of this joint resolution to protect and preserve all domestic sources of iron and steel, to restrain the depletion of iron ore deposits, to retain for domestic use, in the production of iron and steel, all iron and steel scrap which can be and will be used in such domestic production and to avoid so far and so long as possible dependence of the United States upon foreign sources of materials essential to national defense and to the preservation of American industries.

"Sec. 2. There shall not be exported from the United States after the expiration of thirty days from the adoption of this resolution, any iron or steel scrap, except upon license issued by the President of the United States. The President is authorized to grant licenses upon such conditions, under such regulations and in conformity with the public policy herein declared, whenever he shall find that such licenses are necessary in the public interest or for the fulfillment of public obligations, provided that in the granting of such licenses fair and equitable consideration shall be given to the interests of all domestic producers and users of such iron and steel scrap.

"Sec. 3. The term 'iron and steel scrap' is hereby defined to include all materials heretofore or hereafter classified as iron and steel scrap in official publications issued by the bureau of standards in the department of commerce.

"Sec. 4. Any violation of the provisions of this joint resolution shall be a misdemeanor and shall be punished by a fine of not more than $500 or by imprisonment of not more than one year, or by both such fine and imprisonment."

BERRY AS SENATOR HELPS PRESIDENT'S COURT PLAN

The statement was made in these columns last week that Major George L. Berry, co-ordinator for industrial co-operation, had been mentioned as a possible successor for the late Senator Nathan L. Bachman of Tennessee. Political writers from that state here in Washington felt confident that he would not be appointed by the governor. However, the governor thought differently, appointed Berry and the latter was sworn in last week as junior senator from Tennessee.

Thereby hangs a great deal of speculation. The question is what is to become of the council for industrial co-operation. Of course, it is absolutely true that that organization has been doing nothing for months, if it ever did. On the other hand, many of Berry's personal friends, who apparently could not get a job any place else, have been and still are on the council payrolls.

The council was created by executive order and it will take an executive order to disband it. The President just having returned from his fishing trip on Friday, has not yet had time to give any consideration to this matter.

It seems inconceivable that the President will appoint someone to take Berry's place as the head of

the council, especially in view of the fact that he had to do considerable in the way of digging to find money to finance this organization, which still has a lot of people on its payroll.

The appointment of Berry to the senate was pleasing to the administration because as head of the so-called labor non partisan league Berry has been out and out with the President on his court plan. That is one more definite vote with the President on the court, whereas the Bachman vote was an uncertain quantity.

Berry being with the President on this matter, it is not beyond the realm of possibility that he will go to the President and ask to have the industrial council continued to take care of his friends who are still there and who hope to remain. There is not a question of a doubt the organization is outmoded and of no use to anyone, if it ever has been, other than a personal propaganda organization for Senator Berry.

Berry Not Lewis Man

There is one interesting thing in connection with the Berry appointment, the fact that he is not just a spokesman for the CIO. A story is current that John Lewis would never trust Berry out of his sight and there is said to be no love lost between the two men in spite of the fact that Lewis is the second man in labor's non-partisan league, headed by Berry.

The Bachman term covered five more years, Bachman having been in his seat just one year. Berry was appointed to hold office until the next general election in Tennessee. However, if he votes with the President on the court plan, which he will, the administration will certainly do everything it can when the time comes to see that he wins his seat. Of course, being a democrat, the incumbent has the best chance of gaining the seat.

In accepting the appointment of the senate seat from the governor Berry said: "I have accepted the appointment solely on the grounds of my ambition to help the President in all of his efforts to rehabilitate and stabilize our economic structure."

LITTLE NRA PLANNED FOR STEEL AFTER TEXTILE BILL

The little NRA bill, which deals with the textile industry, will be a model for a similar measure for the steel and automotive industries, Representative Keller, Illinois, chairman of the subcommittee of the house committee on labor, predicted last week.

Keller believes that codes or new bills will be introduced in congress to deal with many major industries if the textile NRA proves a success. He believes that it will.

Of course it will be a far cry from the textile to a steel bill but many members on Capitol Hill feel the bill is as good as passed. However, a minority is reserving judgment. This is more especially true as there has been growing talk in Washington of a summer recess for congress.

There are whisperings that congress will take care of some of the "must" measures, as, for instance, some tax bill that would take care of the expiring nuisance taxes, and then take a recess for the summer months, returning to finish the job. However, many members of congress feel that they should stick on the job and get the necessary measures out of the way as quickly as possible and then adjourn.

Hearings were begun last week on the little NRA bill for the textile industry. It provides a minimum weekly wage of $15 and a 40-hour work week, outlaws child labor and abolishes the wage differential between north and south. In the latter connection Keller said: "No recognition will be given the wage differential between the north and the south. This should be eliminated for the best interests of both sections and the country as a whole."

Keller, who is supposed to be up in the counsels of the administration regarding labor matters, seems to feel that action will be taken on some of the little NRA's, as he is pleased to call them, for certain industries, and then there will be some general labor legislation. However, if these things are all taken care of, there is no question congress will be in session for a long time. Matters of that kind cannot be rushed, especially where the opinions of industry and labor are so divergent.

A. F. OF L. OPPOSES HIGHER PRICES FOLLOWING WAGES

The A. F. of L. last week made public a detailed hour and wage statement comparing wage increases with commodity increases, much to the disadvantage of wages from the standpoint of labor.

"Of vital concern to labor," said the A. F. of L., "in the present business situation is the rapid rise of prices. All our efforts to raise wages and living standards and to provide industry's life blood of buying power will avail nothing if the rise of living costs cancels every wage increase."

The statement, part of which was statistical, pointed out that profits in the basic industries have increased substantially. Dealing with steel the federation says: "Steel operated at a deficit in 1934 because of the lower level of activity, but today, with mills close to capacity, profits are increasing well beyond the 4.7 per cent figure of last year."

It is pointed out by the union that in iron and steel the large demand from industry in this country and for munitions abroad made possible price increase of 12 to 14 per cent. "In steel producing firms have combined to eliminate competition, and have thus been able to keep prices at a higher level during the depression, and now to increase them further. In structural steel, demand for warships as well as industrial building brought nearly a 14 per cent increase in prices."

The federation states that the basic industries have been in a position to increase prices greatly in the last two years and none of them, including iron and steel, "has failed to do so. In each case the large demand for products greatly exceeded the supply on hand, and, since these are producers' goods industries, the price increase is paid by another industry and passed on by it to the consumer. The basic industry, being far removed from the final consumer, does not feel the pressure of adjustment to consumer buying power."

Discussing further the control of prices the federation says that "no satisfactory method of controlling prices in general has yet been devised. Efforts toward government control have often ended in failure. Trade union members in foreign countries and farmers in the United States have greatly reduced the cost of goods they buy through consumers' co-operatives, starting in retail business and eventually taking over the manufacture of the goods they sell. In Sweden, a central organization of co-operatives and carefully planned government action have succeeded in utilizing the advance of modern industry to raise the standard of living. In America, our immediate concern is to work out this problem of price control. This can be done only by undertaking the task through joint effort in which labor shall fully share. A Presidential commission to plan the first steps is the initial measure."

PLANS NEW TRADE PACT

The state department has announced that it contemplates entering into a trade agreement with Czechoslovakia. American producers have been advised that any information they wish to lay before government authorities must be done not later than June 6.

SWOPE ON ADVISORY COUNCIL

Announcement was made last week that Gerard Swope, president of General Electric Company, has been elected a member of the Roper business advisory council. Mr. Swope formerly served as a member of the council.

Editorial

Industry Feels Need of Better Training for Top Executives

INDUSTRY generally is devoting a gratifying measure of attention and energy to the important problem of training its personnel for the exacting conditions of the recovery period. Employers are initiating intensive training courses to prepare workers for specialized jobs in short periods. They are reviving apprentice schools and are more attentive to the need of training foremen more carefully than heretofore.

This activity is timely and commendable—as far as it goes. If any fault can be found with industry's attitude on training, it is that the instruction does not penetrate far enough into the upper reaches of the personnel. It is entirely proper to prepare wage earners and specialists at the bottom of the ladder, and it is equally desirable to instruct group leaders and foremen. But why stop there? Why not develop aids for superintendents, department heads, and top executives?

A few years ago such questions might have been considered to be facetious or out of place. Today, with conditions demanding higher and higher qualifications of industry's executives, it is not improper to ask whether or not officials would profit from a more systematic course of preparation than they have been receiving in the traditional school of experience.

Recovery Period Requires Executives Possessing Ability To Deal With Intangibles of Human Nature

Events of the past few years seem to show that management itself already has sensed the fact that the old system of advancement of executives is inadequate. Up to two years ago, the chief qualification of a department head, works manager or plant superintendent was ability to operate his department or plant satisfactorily in terms of output and efficiency. The yardstick of his ability was graduated in units of tons, pieces, etc., per man hour or per dollar of cost. The determining factor was a tangible unit—a ratio expressed in cold percentages.

Today the qualifications are more exacting and the yardstick of accomplishment is calibrated in terms of intangibles, as well as of tangibles. It is not enough that the executive produce results in output and efficiency. In addition to ability along these lines, he must also demonstrate his capacity for maintaining satisfactory diplomatic relations with his employes and with the public of the community in which his plant is operating. During the past 18 months, STEEL and other business publications have published hundreds of announcements of promotions of executives, many of which, if the circumstances were known, meant that a man possessed of the capacity to handle men—to deal with the intangibles of human nature—succeeded to a post formerly held by an executive who was expert in handling the technical phases of operations but was deficient in the sphere of human relations.

The same can be said of executives in the upper brackets of management. Presidents and vice presidents who are thoroughly capable of handling all of the materialistic details of administration have given way to officials better versed in the art of getting along with the prima donna element among employes, directors, stockholders and politicians. Heading an industrial establishment once was regarded as being in the category of an exact science. Today it is veering more and more toward that of an art.

Old School of Experience Does Not Turn Out Enough Graduates to Meet Present Day Demand

Since industry already has indicated that it is cognizant of the change in the qualifications of executives, its leaders should not be hesitant in recognizing the need of more adequate training and preparation. Executives now on the firing line are gaining valuable experience under the exacting conditions of this strenuous period. They are learning in the old school of hard knocks that ability to deal with intangibles is a requisite of successful management. But experience is a slow teacher and the demand for top notch executives is far greater than the supply of graduates from the school of experience. The shortage must be overcome in some other way. Systematic, intensive training seems to be the only alternative.

Such training would fill in many of the deficiencies that are found in the qualifications of the majority of executives today. Only a minority of the present official personnel of industry has a proper conception of the importance of public relations. Even though labor relations is a vital problem at the moment, hundreds of key men in industry still are at a disadvantage when called upon to negotiate with experienced professional labor union representatives. Many industrialists still are out of their element when they try to deal with their own employes. They do not know enough about the vagaries of human nature. They do not have that sixth sense which enables them to grasp the viewpoint of the other fellow—whether he be employe, public official or politician.

STEEL'S INDEX OF ACTIVITY
In Iron, Steel and Metal working Industries
Based upon freight car loadings, electric power output, automobile assemblies (Cram's Reports) and steelworks operating rate (STEEL). Average for 1926 equals 100 weighted as follows: Steel rate 40, and carloadings, power output and auto assemblies, each 20
1937
1936
Per Cent
Copyright 1937 STEEL
1929 1930 1931 1932 1933 1934 1935
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.

STEEL'S index of activity gained 0.1 point to 124.0 in the week ending May 8:

Week ending	1937	1936	1935	1934	1933	1932	1931	1930
March 13	112.7	89.7	84.0	79.9	42.7	54.8	80.6	97.5
March 20	113.1	86.0	84.0	79.7	44.6	54.4	81.3	98.1
March 27	114.0	91.2	84.3	79.3	45.2	53.5	80.6	99.6
April 3	112.0	86.8	83.4	79.6	49.1	53.4	81.5	97.6
April 10	112.8	99.6	85.4	82.2	52.6	52.6	80.9	102.9
April 17	119.6	103.1	86.3	85.0	55.8	53.4	81.1	103.1
April 24	122.0	103.6	84.9	87.5	59.5	52.3	80.6	103.7
May 1	123.9†	103.2	84.6	86.0	60.3	52.5	80.7	103.3
May 8	124.0*	103.0	79.3	84.4	62.5	54.7	79.7	102.8

*Preliminary. †Revised.

Average of Activity Is Running Close to Best 1929 Figures

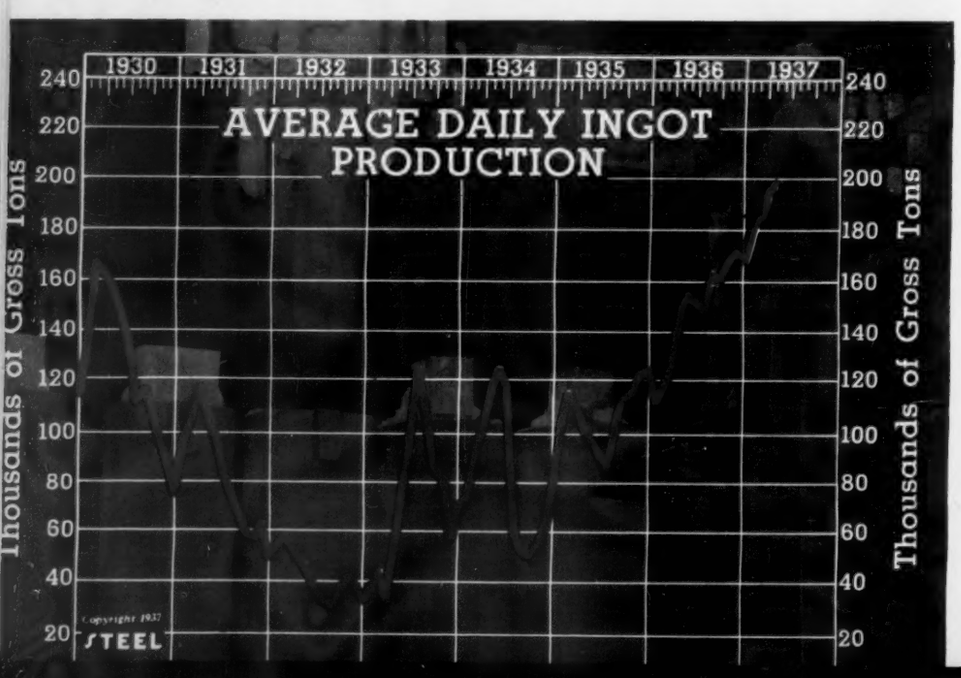
ON THE basis of mathematical averages, industrial activity during the past few weeks has been running neck and neck with that of the record weeks of 1929. The figures for the week ending May 8, 1937, are similar in many respects to those for the week ending April 27, 1929, in which week STEEL'S index touch an all-time high point.

In that banner seven-day period of 1929, the index stood at 125.3. For the current week ending May 8it stood at 124.0. Automobile assemblies in the 1937 week totaled 141,525, an all-time high which exceeds by a slight margin the 140,822 output of the best week in 1929.

Steelworks operations in the week ending May 8 were at the rate of 91 per cent of capacity. In the week ending April 27, 1929, the rate was 101 per cent —but allowing for differences in capacity, the actual tonnage produced today when the rate is in the low nineties is greater than in 1929 when the rate was in the upper nineties or at the phenomenal figure of 101 per cent.

Power output today is running about 22 per cent above the highest figures touched in the spring of 1929. On the other hand, freight car loadings, at around 780,000 cars weekly currently, are about 25 per cent below the comparable figures for 1929. This comparison is deceptive, because, as frequently explained in this column, the present heavy movement of freight by highway trucking is not reflected in car loadings.

Building construction was booming in 1929; today it is lagging far behind other lines of activity.


1930 1931 1932 1933 1934 1935 1936 1937
AVERAGE DAILY INGOT PRODUCTION
Thousands of Gross Tons
Thousands of Gross Tons
Copyright 1937 STEEL

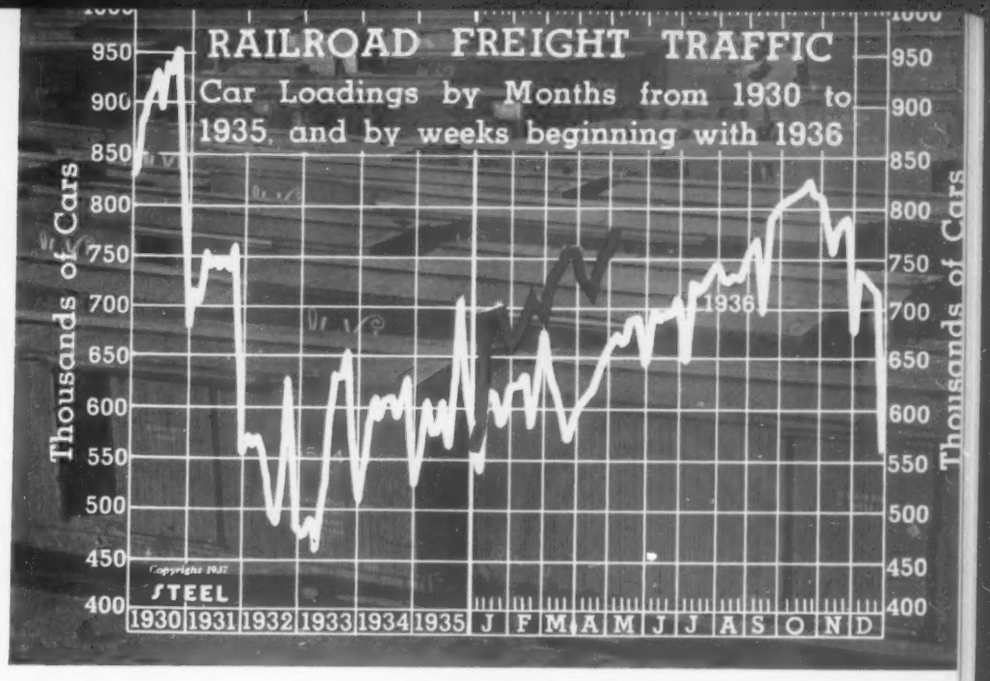
Daily Ingot Production Shows Slight Gain in April

	Gross Tons		
	1937	1936	1935
Jan.	182,181	112,813	106,302
Feb.	184,361	118,577	115,595
March	193,209	128,576	110,204
April	195,072	151,625	101,562
May	.....	155,625	97,543
June	.....	153,263	90,347
July	.....	150,874	87,224
Aug.	.....	161,351	107,997
Sept.	.....	160,043	113,000
Oct.	.....	168,333	116,398
Nov.	.....	173,496	121,170
Dec.	.....	170,448	122,936

BUSINESS TREND

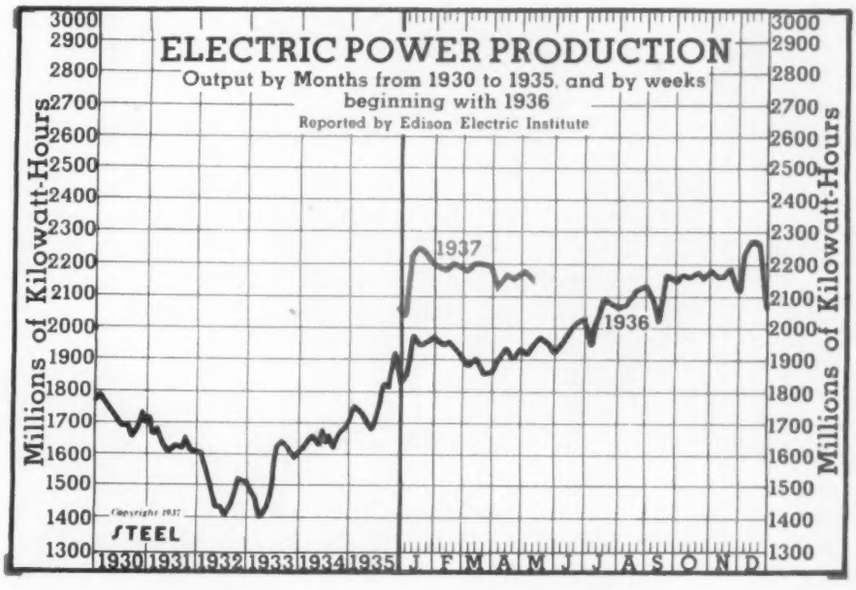
Revenue Freight Car Loadings Continue Upward Trend

	1937	1936	1935
May 1.....	782,423	671,154	569,065
April 24....	761,182	666,181	558,886
April 17....	751,328	642,657	610,905
April 10....	716,044	622,138	587,685
April 3.....	726,687	613,867	545,600
March 27...	761,109	600,487	617,400
March 20...	759,269	566,808	607,700
March 13...	748,993	616,862	597,400


RAILROAD FREIGHT TRAFFIC
Car Loadings by Months from 1930 to 1935, and by weeks beginning with 1936
Thousands of Cars
1936
Copyright 1937
STEEL
1930 1931 1932 1933 1934 1935 J F M A M J J A S O N D

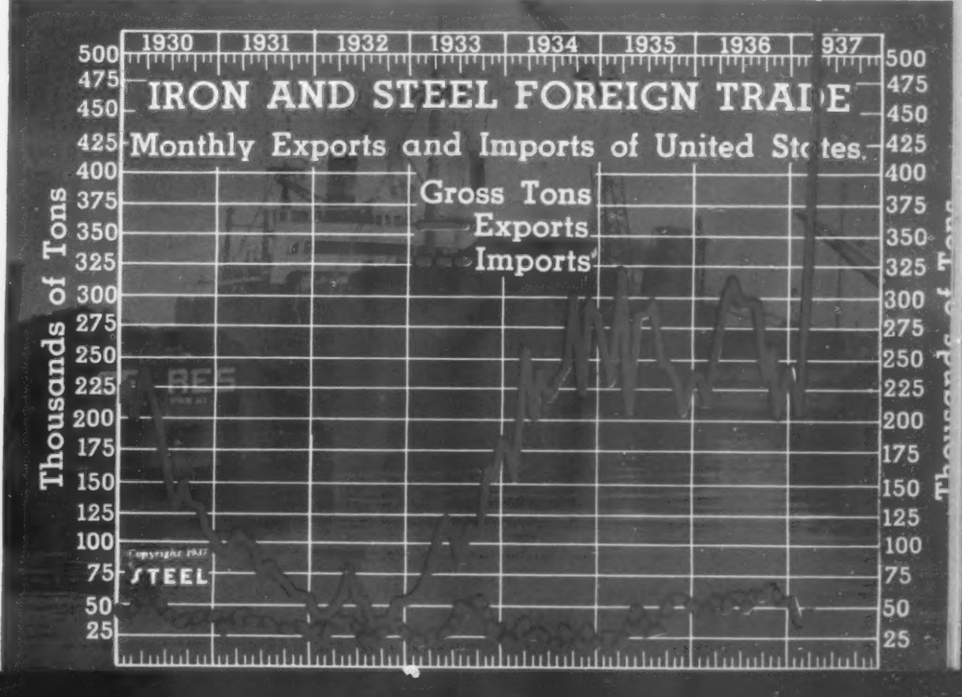
Electric Power Production Maintains High Rate

	1937	1936	1935	1934
May 8.....	2176	1947	1701	1643
May 1.....	2193	1928	1698	1632
April 24....	2188	1932	1673	1669
April 17....	2173	1914	1701	1673
April 10....	2176	1933	1725	1642
April 3.....	2146	1916	1700	1616
March 27...	2200	1867	1712	1665
March 20...	2211	1862	1724	1658


ELECTRIC POWER PRODUCTION
Output by Months from 1930 to 1935, and by weeks beginning with 1936
Reported by Edison Electric Institute
Millions of Kilowatt-Hours
1937
1936
Copyright 1937
STEEL
1930 1931 1932 1933 1934 1935 J F M A M J J A S O N D

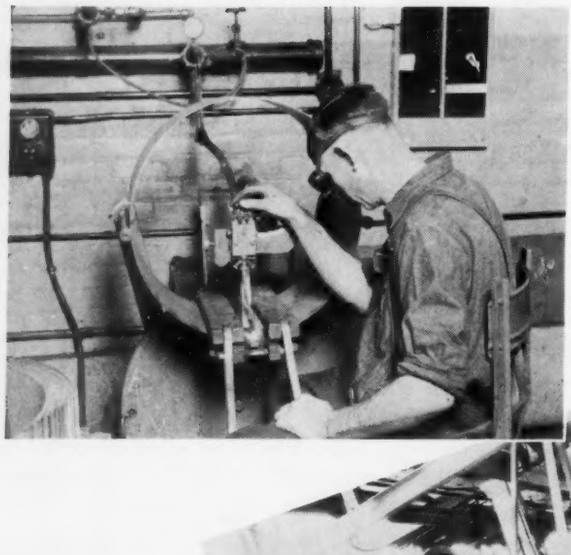
Steel Exports Up Sharply in March; Scrap At Record High

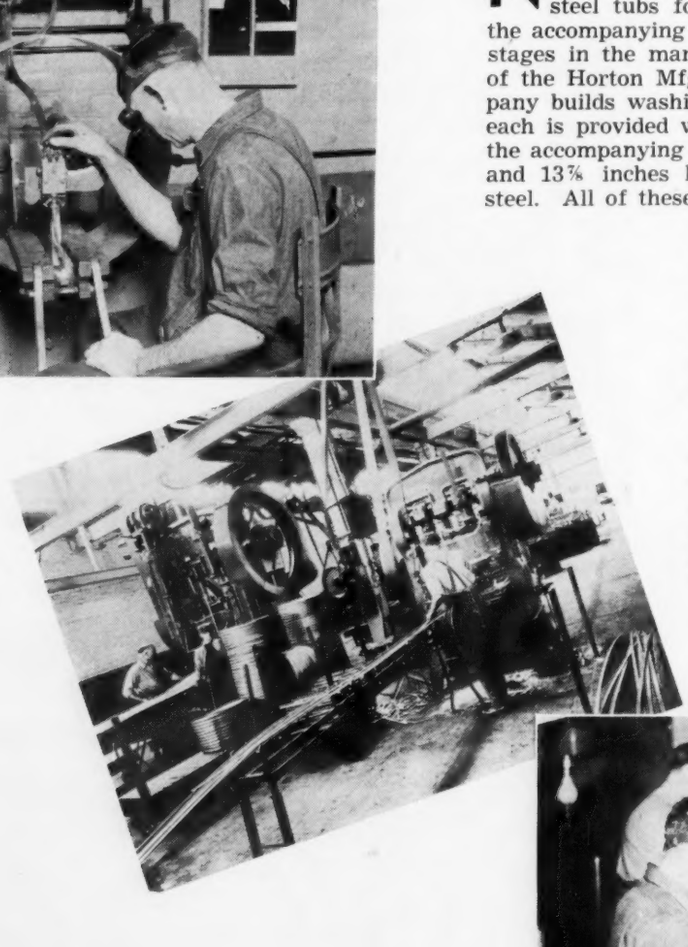
	Gross Tons			
	1937		1936	
	Imports	Exports	Imports	Exports
Jan.....	43,063	201,692	50,489	241,564
Feb.....	41,628	290,987	43,358	213,802
March..	51,805	570,576	56,720	264,337
April...	.....	.....	49,621	301,987
May.....	.....	.....	59,391	314,950
June ...	.....	.....	59,910	294,951
July....	.....	.....	47,940	296,738
Aug.....	.....	.....	60,697	295,341
Sept. ...	.....	.....	59,993	235,571
Oct.....	.....	.....	64,509	261,882
Nov. ...	.....	.....	61,970	203,297
Dec.....	.....	.....	52,584	244,156

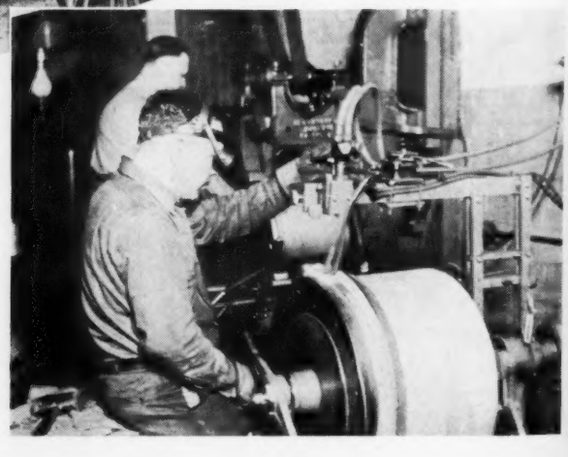


BY FRED B. JACOBS

Special Operations Feature Metal Tubs







EDGES of the sheet are held in a special fixture and welded together in the top view, while in the center a 150-ton geared press is blanking out bottoms for the tubs. Lower photo shows the special apparatus for welding the walls and bottom together

NUMEROUS interesting operations and production units are entailed in the fabrication of corrugated steel tubs for household washing machines. In the accompanying illustrations are shown a number of stages in the manufacture of such units at the plant of the Horton Mfg. Co., Fort Wayne, Ind. This company builds washing machines for several outlets and each is provided with a different tub. That shown in the accompanying illustrations is 23 inches in diameter and 13¾ inches high and is made of 18-gage sheet steel. All of these tubs later are provided with porcelain enamel finish, a factor that has much to do with the fabricating operations.

When the steel sheet is cut to size care is exercised to make the ends square so that a true cylinder of uniform diameter from top to bottom is formed. After passing the cut sheet through bending rolls which form it into cylindrical shape, the seam is welded in a special fixture built at this plant. Sheet edges are held by this fixture, heated by an oxyacetylene flame which is fed across the seam at a speed of about 4 feet per minute and squeezed to-

Manufacture of Corrugated for Washers

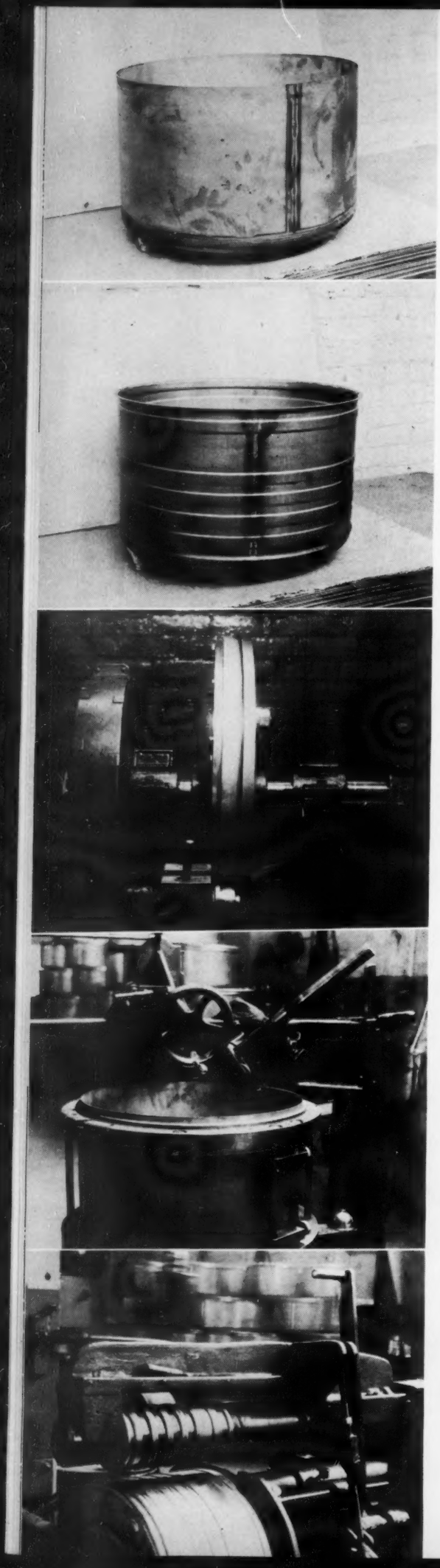
gether. That is, the welding is of the fusion type, done without using any filler rods. The oxyacetylene equipment was furnished by the Linde Air Products Co., New York.

The tub bottom is blanked and drawn from 18-gage sheet steel under a 150-ton geared press supplied by Niagara Machine & Tool Works, Buffalo. Accuate trimming of this stamping is done on equipment specially designed and built at the Horton plant. In this unit the part is held securely between two clamping plates and rotated slowly while a rotary trimming knife is fed toward the work.

Welding the bottom to the side is accomplished on equipment designed and built at the plant. These parts are securely clamped in place and rotated at a speed of about 12 feet per minute. During this rotation the joint is closed by fusion welding with the oxyacetylene flame.

In the next step surface irregularities which might show up through the porcelain enamel coating to be applied later are removed. An ingenious method has been developed by the company for smoothing the weld on the inside of the

Levelling the external seams is accomplished with a power hammer as shown in the top illustration. Center is a view of the department where all fabrication operations are carried out, and below is the setup used for smoothing internal welds



tub where the bottom joins the side. The tub is held on revolving rollers while the seam is ground with a manufactured alumina wheel 6 inches in diameter, with ¾-inch face and made of 36 grit, medium grade. The abrasive is Borolon, furnished by Abrasive Co., Philadelphia. The wheel is mounted on a flexible shaft and operated normally at surface speed of approximately 5000 feet per minute. Wheel is held in contact with the work by spring pressure and the weld is ground smoothly and evenly as the tub is rotated at a speed of about 15 feet per minute.

Sometimes a hand grinding operation is employed to smooth the outside seams, using a wheel of the above specifications mounted on a flexible shaft and applied by hand. Usually, however, these seams are leveled by hammering, using a power hammer furnished by Pettingill Machine Co., Amesbury, Mass. The fixture for locating the work was designed and built at the Horton plant.

Bead Formed by Spinning

The bead at the top of the tub is formed by a spinning operation on a special machine. In this unit the tub is clamped to a revolving fixture so hinged that the front half opens to facilitate loading and unloading the work. The operating speed is about 30 revolutions per minute. A spinning roller is carried on a bracket just back of the handwheel. This wheel feeds the bracket downward so that the roll flows the metal over the bear generating form on the fixture.. The roller shown on the handle at right is used in finishing the bead on certain types of tubs where a full bead is necessary. The roller first mentioned forms a flat-top bead only.

A rolling machine furnished by Niagara Machine & Tool Works, Buffalo, is used to roll ridges or corrugations on the side of the tub to strengthen it and improve its appearance. The machine is fitted with two sets of formed rolls so that the depressions shown on the upper roll are located over ridges on the bottom roll. With the tub in place, rolls rotating and pressure applied by means of the hand lever at right, the roll shapes are transferred to the work. This corrugated design may be applied without any danger of opening the welds.

HERE are portrayed, top to bottom, appearance of a tub after walls and bottom are welded; finished tub ready for cleaning and enameling; trimming the bottoms after they have been stamped; apparatus for spinning the bead around the edge of the tub, and a rolling machine for placing ridges in the side of the tub

Cast Iron Paving Makes Progress

DETAILED by the state of Minnesota to seek a way to build safe highways with cast iron surfaces, Prof. E. W. Davis, superintendent of the mines experiment of the University of Minnesota, Minneapolis, has found that design of the pattern on the cast iron paving blocks is of great importance. In experiments during the past year he has tried out more than a dozen designs. Tests with one design revealed that a car will skid forward less than on ordinary pavement. Another design prevented side skidding to a considerably greater extent than is the case with concrete. The present effort is to evolve a design that will prevent both forward and side skidding.

Plans already have been outlined for a 150-foot stretch of iron paving on the university campus, to be laid as soon as weather conditions permit. Extensive tests on this cast iron pavement will be made this summer with automobiles and trucks. Tests so far made have been conducted on a cast iron paving stretch 24 feet wide and 30 feet long laid on the university campus more than two years ago, as described in STEEL of Aug. 6 and Nov. 26, 1934.

The Minnesota state highway department recently requested the United States bureau of public roads for permissioin to change the specifications for paving so as to permit the use of a test iron pavement on the Miller trunk highway near Eveleth. The project involves about 5000 square yards of paving surface and of the additional $27,500 outlay required for cast iron pavement St. Louis county already has appropriated $15,000.

Pamphlet Describes Metal And Alloy Structures

First in the series of monographs and reports to be prepared by the British Institute of Metals has recently made its appearance. It is entitled "The Structure of Metals and Alloys" and is written by William Hume-Rothery. The new work covers the electronic background to metallurgy, the crystal structure of the element, the atomic radii of the elements, primary metallic solid solutions, intermediate phases in alloy systems and imperfections in crystals and deviations from ideal lattice.

Copies of the booklet are available from the institute, 36 Victoria street, London.

BY C. R. MAXON

Die Castings in Automotive Applications

Part III

NOT long ago, the bells and other parts of horns were largely stamped and drawn parts. Today, both bells and bodies, some with quite intricate spiral passages, are die cast. One important reason for this change is that the die casting is not only less expensive, but, in the case of some designs, is the only feasible method of production. Another reason is that tone qualities are secured with the zinc alloys superior to the stamped sheet formerly used. Although the die cast horn probably weighs more than one built up from stampings, the former are produced with quite thin sections and this saving in production cost is not to be overlooked.

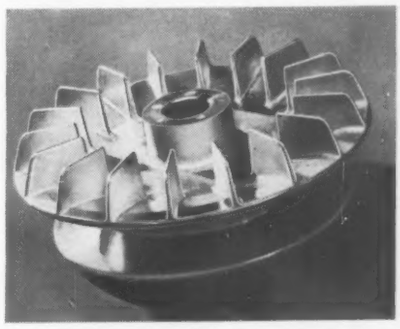
With a stamped product, several parts are required and considerable soldering is needed in assembly. Drawing operations in stampings require expensive dies in addition to blanking dies, whereas the single die for die castings costs less initially and is more easily maintained. In the modern application of horns, hidden under hoods or fenders, finish is not so important as it was when the horns were prominently displayed in front of radiators. Finish was then important and was usually superior with the die cast horn. In this connection, it should be remembered that a drawn part not infrequently shows a rippled surface which, when plated and polished, shows the irregularities prominently. Some such parts also tend to go out of shape when buffed. These disadvantages are not encountered with the die casting.

DIE cast horn parts, one of which carries integral projections which pass through mating holes in the other half and are afterward spun over to fasten the parts together permanently

Reference to accompanying illustration of horn castings shows them to be split in the anis of the bell and the spiral leading into it. The mating faces have to make a tight fit and are held together by several screws or bolts, or in some designs by rivets which are made integral with one casting and afterward spun over when the parts are assembled. In such applications, or any others in which the zinc alloy is put under compression by tightening the screws, it is well to remember that the zinc is subject to a certain small creep or cold flow. For this reason, the thickness of bosses should be minimized and it is wise to use a spring washer, as there is some tendency for screws to loosen. This has caused trouble where precautions against it have not been taken, but with proper design it is not serious, as otherwise die castings could not be used in many automotive applications, such as the horns in question and fuel pumps, of which many millions are in use.

Chassis Applications

A large majority of the applications of die castings to chassis parts are so well known and so much taken for granted as not to require extended comment here. Such parts as carburetor bodies, fuel pumps and filters, lamp brackets, accelerator parts, oil seal rings for crankshaft bearings, distributor brackets, steering column brackets, shifter lever trunions and balls, running board fittings and steering wheel hubs have either been mentioned before or are so commonplace that further mention is not necessary.



PULLEY with flanges for V-belt and integral cooling vanes for air circulation through the lighting generator which it drives. It is typical of somewhat complex parts which are readily die cast

Somewhat less common, but of growing importance are such parts as end plates for vacuum brake cylinders and several similar or supplementary castings in vacuum cylinders and housing parts on vacuum-operated gear shifters and clutch actuating elements. The reasons for using die castings in such parts is much the same as for other chassis parts, and so need not be detailed here.

An unique application of die castings developed recently to solve a difficult problem, however, is that in the Bendix-Weiss universal joint.

This joint, instead of using the conventional trunion, carries a steel ball between races supported by the yokes of the driving and driven portions. The races are hardened steel and the yokes are steel forgings with splined hubs. To make the races integral with the hubs involved production problems such as to make it difficult to compete with joints of more conventional design. It is relatively simple, however, to make the hardened races separately. The problem was to secure them to the yoke in precisely correct position at moderate cost. An excellent solution of the problem was found in the use of zinc alloy die cast in such a way as to form a matrix joining the respective parts. In other words, the yoke and the two races are held in correct relative position in a casting die and the space between and around them is filled with the zinc alloy by the die casting process. As the zinc alloy is in compression, in which it has a strength of at least 60,000 p.s.i. (some zinc alloys run as high as 93,000 p.s.i.) it is understood to meet all requirements, even under

BENDIX-WEISS universal joint in which a die cast matrix of zinc alloy accurately positions the hardened steel ball races in reference to the forged steel yoke

heavy overloads, shock loads and low temperatures.

Although this is an unusual application, it may well suggest others in which zinc alloys may be used in combination with other metals employed as inserts to provide properties which the zinc alloy itself cannot meet. As the casting temperature of zinc alloys is under 850 degrees Fahr. and they cool very rapidly in the die, the temperature of inserts is not raised enough to soften a hardened steel part or, in fact, to adversely affect such materials as phenolic plastics, wood, or even compressed paper, all of which are sometimes used as inserts, though not, as far as the writer can recall, in automotive parts. It is a common thing to insert a bronze bushing or an insert of steel in die castings and there is little doubt that, by the intelligent use of inserts, many die castings might be improved or made lighter. There is still plenty of opportunity for the designer to use his ingenuity to advantage along this line.

Finishing: Plated Coatings

No paper on the general subject of die castings in the automotive industry can be considered complete without reference to the subject of finishing. At the present time most finishing on automotive parts is of the plated type. In recent years practically the entire automotive industry has standardized on certain definite specifications for plated coatings on zinc alloy die castings. Assurance has been given by the leaders in the industry that electro deposits satisfying these specifications are giving good service.

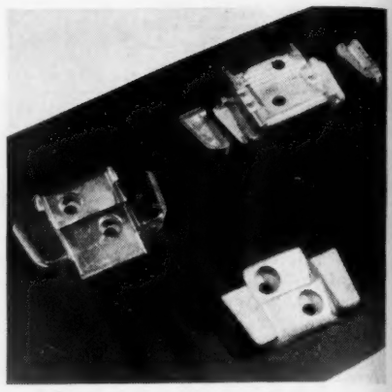
It is not necessary to go into detail as to the individual specifications of the various companies. In general, they all require heavy coatings, the minimum varying from 0.0008 to 0.001-inch. This may be composed of a series of copper, nickel and chromium, or of nickel and chromium, the option being allowed in most cases. Where the sequence is copper-nickel-chromium, the minimum copper thickness is specified variously as 0.0002 and 0.0003-inch. The nickel deposit is variously specified as a minimum of 0.0003 and 0.0005-inch. The chromium in most cases is required to be a minimum of 0.00001-inch, although one large producer requires 0.000025-inch. It cannot be too strongly emphasized that the satisfaction now being obtained with plated die castings in the automotive industry depends upon the conscientious fulfillment of these specifications.

In addition to the thickness of coating specifications, most automotive concerns also specify some type of quality test such as salt spray or contact with hydrogen sulphide. Tests of this type are intended to detect major deficiencies in quality.

One cannot leave the subject of plating specifications without calling specific attention to the fact that they are based on definite experimental and service evidence compiled by a number of capable workers in the industry, and they are not figments of imagination, but definite operating limits based on experience.

With the exception of the use of

PRESENTED on these pages is the third and concluding instalment in Mr. Maxon's interesting series on use of die castings in the automotive field. Previous instalments of the series appeared in the April 19 and May 3 issues of STEEL



SMALL die castings used as parts of door dovetails. In some cases the bumper shoes are die cast and in others they are of porous bronze. Striker plate is stamped, backed by sheet rubber and fastened to the die casting

color as a contrast for chromium plate in ornamental parts, not many automotive die castings are subjected to organic finishing. The details of the procedures used in specific instances are not available. It is definitely known, however, that at least one finishing system calls for the use of a suitable primer over which either an air drying or baking finish may be applied. Other systems on which experimental evidence is now available permit the application directly of baking enamels on the zinc alloy die castings. In this system the die castings are pretreated in a phosphate type solution. This pretreatment makes it possible to select the desired finish on the basis of color matching, coating properties, etc. without consideration as to its applicability to zinc.

Notes and Suggestions on Design

In the foregoing comments on current applications there are indicated or implied numerous "do's and don'ts" which the designer should observe for optimum results with die castings. There are in addition many general observations, some of which may appear trite but which are, nevertheless, so frequently overlooked that repetition is fully justified. Some of these and certain other recommendations are given in following paragraphs, a review of which may well repay any designer who is about to lay down a new design for a die casting. The need for considering such items as these is apparent if the views of one engineer, whose duties require that he criticize and strive to correct the faults in suggested designs for die castings, within his own company, is to be taken at face value. He says in effect that two out of three designs as submitted to him are regarded as unsatisfactory, usually be-

Pages to His Majesty: "King Production"

The "CLINCHOR"

Feeds and Sets CLINCH NUTS Automatically.

A new type of machine answering the demands for better production methods for setting Clinch Nuts.

The clinch nut, which has been automatically placed on the anvil, locates the work. The ram coming down sets the clinch nut.

May we send you a circular describing the many details so important for successful production?

The "RIVITOR"

Feeds and Sets SOLID Rivets Automatically.

The work is placed over the locator in the anvil. The rivet is fed automatically into the jaws which are carried down by the ram. The head is formed underneath the work. A gain in strength from 10% to 19% is accomplished (over that of other type rivet joints.)

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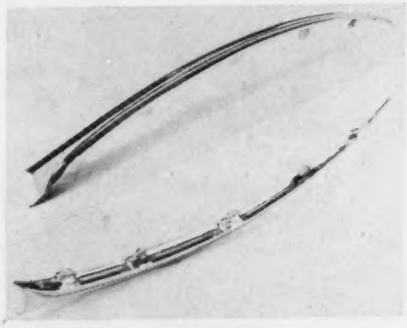
THE TOMKINS-JOHNSON CO. 611 N. Mechanic Street **JACKSON, MICHIGAN**

European Office: Gaston E. Marbaix, Ltd., Vincent House, Vincent Square, London, S. W. 1, England

cause some more or less commonplace requirement for best results has been overlooked or brushed aside. Whether over-stated or not, it is at least apparent that more careful consideration of items such as are listed below would avoid much "grief" for all concerned.

As in other types of castings, both inner and outer corners and edges should have fillets; the larger the better. Although sharp corners can be cast, they often if not always tend to disrupt the smooth flow of metal and are likely to result in defects. These may include increased porosity and surface blemishes productive of much trouble in finishing and resulting in much more numerous rejects, often after considerable time has been spent in polishing and plating. When, for aesthetic reasons,



DIE cast ornament for Packard headlamp which is held in place by integral hooks and a clip, the undercut being broached in one operation

the stylists insist on sharp edges, even a very small fillet, hardly visible except on close inspection, may help materially. Omission of fillets often results also is breakage otherwise avoided, and also make polishing and buffing more difficult. Plating is also adversely affected.

Where buffing is required on any surface of the casting, as it usually is before plating, the designer should try to visualize the position the casting must assume relative to the wheel and so design the surfaces that they are reached readily by the buffing wheel. Depressions, when required should, so far as possible, lie parallel to the direction of motion of the casting in reference to the wheel, should be as shallow as conditions permit and should have sweeping fillets where the depression merges with other surfaces. Ribs or beading likewise should be parallel with the normal motion of the casting against the polishing wheel and have liberal fillets where they join other surfaces. Convex surfaces are usually much easier to buff than concave ones. A surface of rotation is usually easy to polish if not interrupted by projecting parts. Thus, a circular steering wheel hub is readily polished on a rotating fixture, but if its surface were interrupted by projecting spokes the buffing would obviously be more difficult.

Large plain flat surfaces should be avoided if exposed to view in service. They are likely to be wavy or to have blemishes which are not easy to remove. Even slightly crowned surfaces may tend to avoid such defects, especially as they give concentrated highlights when plated and polished. Stepped or relieved surfaces, or well rounded beads or bands of beads, often improve appearance greatly and tend to mask defects, of no consequence structurally, but tending to stand out prominently on a flat surface. The casing of the car heater here illustrated is an example of good design including well rounded corners and the use of steps and beading in such a way as to enhance appearance without departure from simple and attractive forms. Incidentally, when constructing a die for a part of this kind, it is often much better to work from a dummy or model than from a drawing in which the curves have to be defined geometrically. Where fastenings or other locating parts are to be held within close limits, of course, these dimensions are better located from a drawing.

Uniform Thickness Desirable

Sudden changes in section thickness should be avoided, so far as possible, but where not avoidable the largest possible fillet should be used or the transition should be made as gradually as possbile. Weight can often be saved and stiffness improved by judicious use of ribs and bosses, or reinforcement at fastening points.

Perhaps there is no general rule so frequently stated or so often overlooked as that of consulting the die caster fully, and as early in the design as possible. The capable die caster is usually versatile enough to get around difficulties in casting occasioned by poor design from the casting standpoint, but he naturally must charge for the extra work and die expense involved. The die caster thinks first of such matters as gating, which have much to do with producing perfect castings of good finish, whereas the designer looks more toward the results to be attained by the casting when he gets it. The objective is usually to get the best part at the lowest cost consistent with desired results in the application of the casting, and there are rarely times when early and frequent consultation with the die caster will not help to secure this result. It need hardly be added, perhaps, that the metal suppliers are always ready to assist in such matters as fall within their province and to give their opinions, after suitable research, when this is required, as to performance under given conditions, especially when these are unusual. There is, of course, a great wealth of accumulated experience with die castings with which both the metal supplier and the competent die caster is familiar, and either is ready to share this with those having a legitimate interest in profitting by it.

Diesel Data Designed To Solve Problems

Diesel Hand Book; semiflexible cover, 720 pages, 5 x 7 inches; published by Diesel Engineering Institute, Jersey City, N. J.; supplied by STEEL, Cleveland, for $5 plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

The 1937 edition of this book of diesel instruction has been enlarged to keep pace with development of this form of power producer. It is a guide for those seeking solution of problems arising in this industry, written in language understood by nontechnical readers. It includes tables and formulas for calculations in diesel practice.

It is intended also for those who operate this form of motive power in any form of service.

Independence in Optical Glass Assured for U. S.

Named as one of the 23 vital raw materials in time of war, optical glass is now produced in required quantities and qualities domestically to assure an adequate supply for any emergency according to Carl S. Hallauer, vice president, Bausch & Lomb Optical Co., Rochester, N. Y., where research on this material has been carried on since the war.

Improvement by chemical manufacturers of the quality of potash and barium has been largely responsible for the improvement in the glass, according to Mr. Hallauer.

Copies of Paper on Furnace Atmospheres Are Available

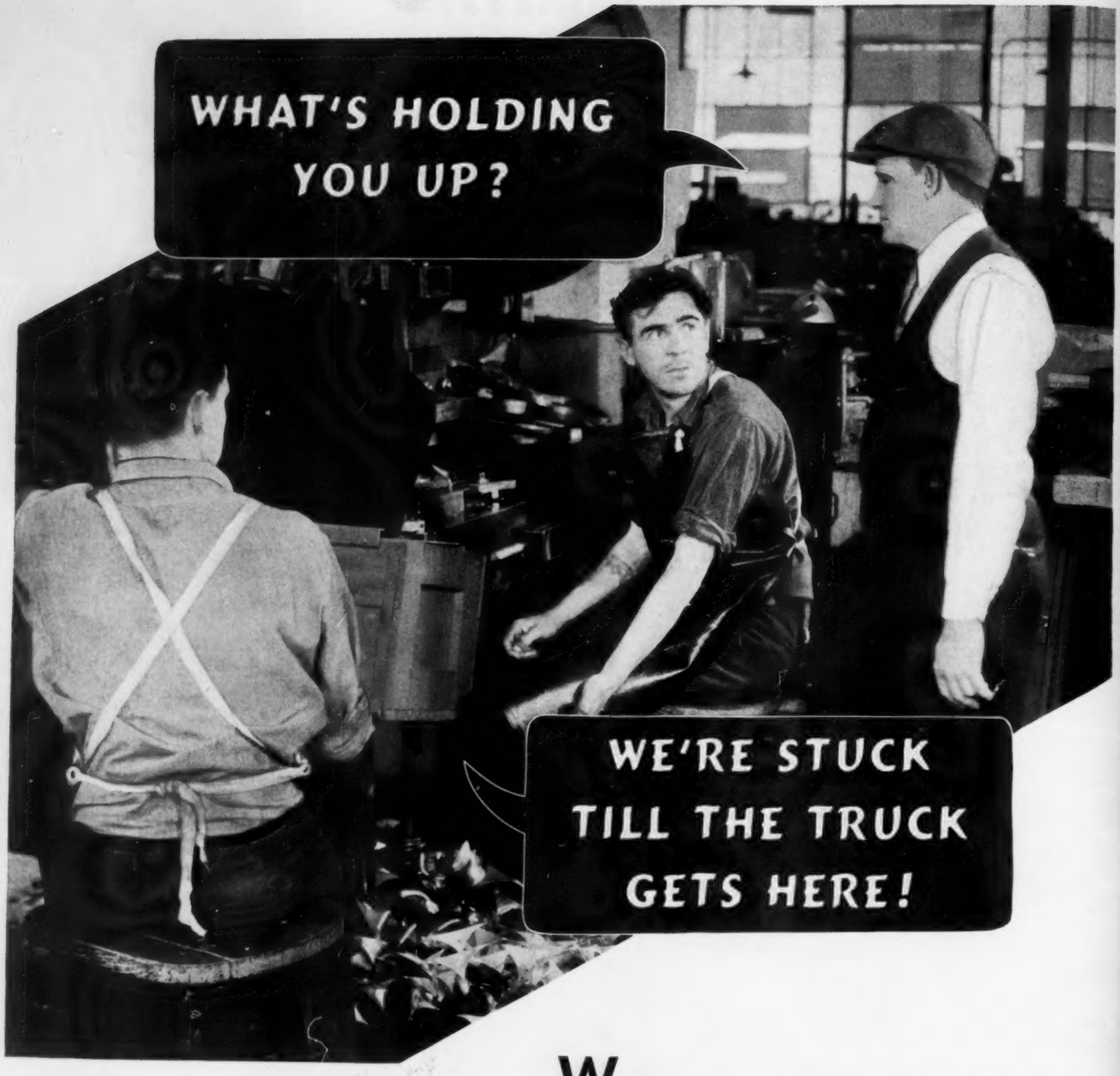
The paper entitled "Furnace Atmospheres", by A. J. Fisher, fuel engineer, Bethlehem Steel Co., Bethlehem, Pa., has been reproduced by C. M. Kemp Mfg. Co., Baltimore, for distribution. Copies accompanied by 19 full sized pages of graphical information may be obtained direct from the company or from the editors of STEEL. Mr. Fisher's paper, the subject of widespread comment, was delivered on Feb. 6 before the Philadelphia district section of the Association of Iron and Steel Engineers.

SCALE BREAKER AND ROUGHING STANDS:
M-H Alloy Steel Rolls

INTERMEDIATE STANDS:
Molybdenum Chill
Grain Type
Nironite C
Compos-ite

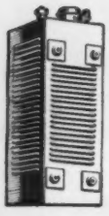
FINISHING STANDS:
Nironite C
Compos-ite

BACKING UP ROLLS:
M-H Special Alloy Steel



WHAT better device is there to link machines together than the battery industrial truck? There is none. The most modern note in material handling is the battery truck. Its flexibility is unchallenged.

Its ability to work all hours, through thick and thin, cannot be approached—when its battery is steel-alkaline. Stalls and jams don't happen. Of the twenty-odd brands of industrial batteries made in U.S.A., the Edison is the only really different type.



So sure and positive is the power of the Edison Steel-Alkaline that it is used in over 50% of all battery industrial trucks. Even keener is the steel industry's appreciation of the Edison—70% of steel mill trucks depend on it.

Now that steel mills are crowded with orders, the Edison's extra grit is more prized than ever. See a demonstration. Some points you will see in an instant. Others you will discover during its 2 to 5 times longer life.

EDISON STORAGE BATTERY

DIVISION OF THOMAS A. EDISON, INC., WEST ORANGE, NEW JERSEY

MATERIALS HANDLING

Economical Methods of Handling Sheet Steel

IN CONNECTION with a recent move into this larger and more modern warehouse particular attention was given to the layout and facilities for handling steel stock. The plant is engaged in supplying a wide variety of sheet, strip and coil steels from 7 to 30 gage and has facilities for cutting, slitting and shearing stock to specified dimensions within the accuracies required by the customers.

This work is almost entirely handling operations from receiving to shipping. Therefore, only by careful control of handling can costs be kept within the limits necessary to meet competition at a profit.

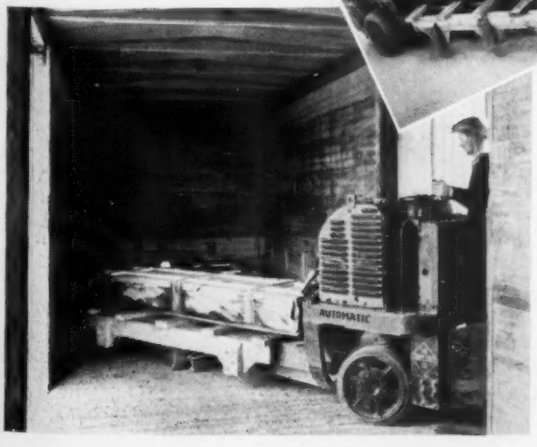
Economical handling necessitates moving in as large quantities or units as possible with a minimum of relays or steps and leaving the material in the best arrangement for necessary rehandling. Since practically all material goes in and out of storage all handling is planned to consider facilitating the necessary rehandling.

In the old warehouse not so many years ago steel was handled and rehandled a sheet at a time. Installing a roller conveyor to carry the sheet from the car into the plant, thus eliminating the congestion at the car door, was a big improvement. Today the incoming package of sheets or strips is lifted and handled as a unit until it is necessary to break it up. From that point the package is subdivided and arranged for ease in rehandling.

Problems in handling materials in this warehouse may be grouped around receipt, storage, to and from shears or slitters, and shipment. The entire procedure is laid out for

SCRAP is baled and accumulates, as at right, until there is enough to fill a car. It is then transferred to the dock and loaded in one operation

LOW-LIFT gas powered trucks are used in transferring skid loads from storage to shears as shown at right



BOX cars are unloaded by the same type truck, shown at left. These trucks are also used for long hauls

BY H. W. ANGSTEN
President, Corey Steel Co.
Cicero, Ill.

MATERIALS HANDLING

handling in packages by crane or on skids by Automatic Transportation gas-electric powered elevating platform trucks of low-lift and tiering types or hand elevating trucks.

Practically all incoming steel stock is received in carloads, with about 90 per cent shipped in gondolas in packages, double-wrapped in waterproof paper. There packages are removed from the open cars and placed on skid platforms by a 5-ton Lo-Hed electric hoist on a craneway extending out across the tracks the length of the car but high enough to clear a box car.

Steel received in box cars is ordered shipped on skid platforms and removed by standard low-lift Automatic Transportation gas-electric elevating platform trucks. An exceptionally well-equipped shipping platform, which will be described later, permits quick handling of steel received by truck.

Incoming packages of sheets and strips are unwrapped, weighed and transported, still on the skid platform, to the crane bay in which they are to be stored. Floor trucking is carefully apportioned among three types of lift trucks and some caster and wheeled trucks for use at shears. Standard gas-electric lift-platform trucks handle incoming steel to the storage bays and miscellaneous long hauls. Gas-electric tier-lift trucks of similar make or overhead P & H traveling cranes pile the steel and remove from storage. Hand-lift Steubing-type platform trucks handle short hauls such as movements around machines and order picking of small lots from storage.

Caster and 4-wheeled trucks with tops at working height are used for cut work at the machines. Similar box trucks with casters receive sheared ends, trim and scrap. Heavy loads of scrap are pushed or pulled to the scrap baler by a power truck; light loads are moved by hand. Practically all scrap is of soft steel. Other grades of scrap are kept separate as they bring a higher price.

Sometimes incoming steel goes directly to the shears or slitters but generally it has to be stored. After weighing, the incoming package is placed in the proper bay by the low-platform power truck. The storage bays are served by three 5-ton and one 10-ton, 36-foot span P & H cranes fitted with special sheet handling grabs.

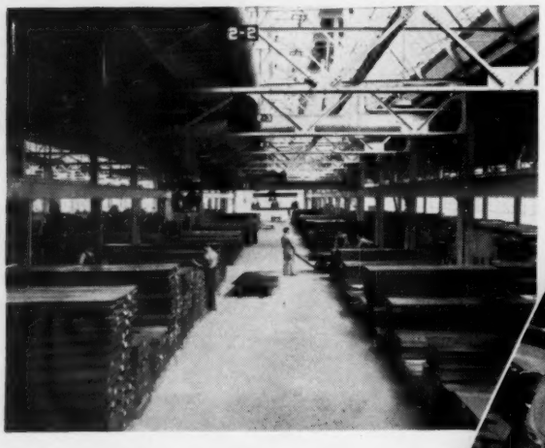
These grabs, incidentally, were originally developed in this warehouse for handling sheets without damaging. Sheets with bent edges or corners must be cut down to eliminate the damaged sections with considerable loss. Ordinarily this damage in handling is an important loss and so equipment for its prevention soon pays for itself without considering the increased speed and ease in handling.

These grabs spread apart over the pile of steel sheets or strips and close around it inserting fingers underneath the steel and lifting it as a unit, either to storage or from storage to the skid platform.

Method of Storage

Packages of stock sizes of steel are piled with two 2 x 4-inch plank spacers set lengthwise to provide space for the fingers of the grab and also to eliminate recounting or rehandling by individual sheets.

(*Please turn to Page* 83)



STOCK sizes of sheets and strips are piled with wooden spacers as shown at left, to permit entrance of the fingers on the special grab shown on the crane

WHERE width of sheets allows, skid platform loads are piled two and three high as shown at left. Tiering trucks are used for this operation

TRUCKS for outgoing shipments are loaded as shown at right, by any one of the three types of trucks. Crane handles loads of sheets with the special grab

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POWER DRIVES

Application of Power to Machine Tools Must Be Carefully Considered

BY EDGAR L. BAILEY*
Electrical Engineer, General Master Mechanics Division, Chrysler Corp., Detroit

LAST year I was called on to purchase and put into operation all the electrical equipment for a large sheet-metal press plant, with its die shop, metal finishing department and also a complete automobile assembly plant with its conveyors, hoists, ovens and many other electrically operated or controlled devices. This gave me an excellent opportunity to observe just what is received on a purchase order for a machine tool.

In our corporation the machine tool is selected and purchased by a tool engineer, who has complete knowledge of the work to be performed. The machine tool manufacturer usually recommends the horsepower and speed of the motor required. The electrical department then specifies the particular motor and control to be used, either purchasing these items directly, and shipping to the machine tool manufacturer, or having him furnish the kind, type and style of equipment desired. In many cases the machine tool manufacturer will recommend and furnish a special motor and control.

Ideas of Application Vary

In all of these arrangements, the machine tool manufacturer will mechanically mount the motor and control, furnish and install the mechanical power transmission from the motor to the tool, and in some cases furnish and install all electric wiring to motors and control ready for attaching to electric supply. It is in this final phase of mounting and wiring motor and control, that there seems to be a wide divergence in ideas of a satisfactory application of power.

The selection of the power for a certain machine tool can and does receive careful consideration. The motor designer is furnished with complete data regarding maximum torque, allowable slip, starting requirements; in fact a complete duty cycle is worked out, so that the most satisfactory and economical motor can be selected. The purchaser of the machine tool is usually quite satisfied to accept the vendor's recommendation for a motor size and speed as the buyer has found that an undersized motor seldom, if ever, is recommended. In fact the tendency has long been to overpower machines with a resultant poor power factor for alternating current circuits.

The selection of the control is largely a matter of individual choice and of plant standards, and thus subject to wide variation. Some engineers seem to feel that the lowest first cost is the wisest purchase, while others insist on a low maintenance, rugged type of control. This difference of opinion, together with the evident advantage to the vendor of the machine tool to keep his costs at a minimum and hence the selling price as low as possible, is responsible for a tendency on the part of the vendor to furnish cheap control, when not specified, and to omit the wiring altogether.

When motor and control have finally been selected, they must be mechanically mounted in such a way that they are truly a part of the machine. Here we must go back into the design room and do this job right. A bracket, a shelf or a bolted-on bedplate may not be satisfactory for either motor or control. Every motor, control mounting and wiring is a separate and important job that must have careful planning wherever it is done, and I think the tool manufacturer should do this job completely.

Mounting of the control offers a much greater latitude of choice than for the motor, but also requires in some ways more ingenuity to locate the control so that it is completely protected, rigidly supported and readily accessible for maintenance.

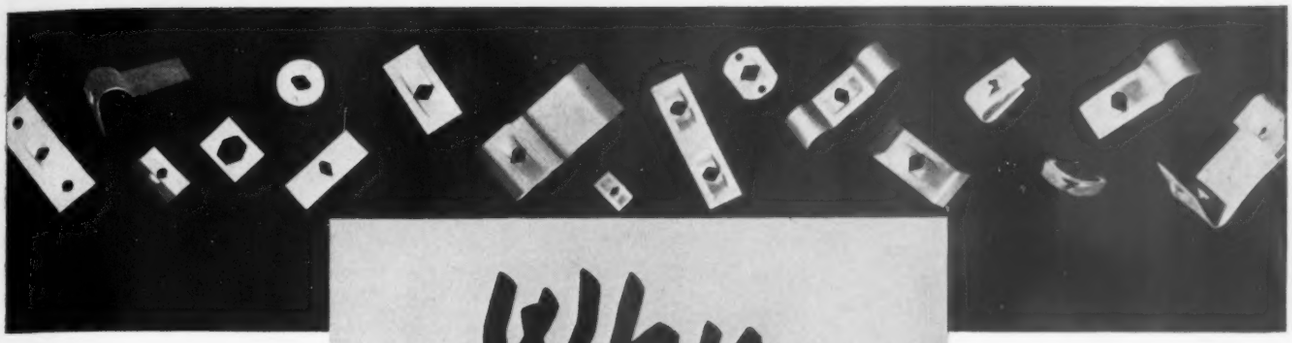
Wiring of the motor and control is the final work done on the machine tool according to the present practice. I regret to state a belief many manufacturers who attempt wiring simply call in their plant electrician at this point and say "wire her up." The plant electrician has been schooled in the use of conduit, clamps, wire and tape and proceeds with material from his stock, to get the job ready in the least possible time and at the least expense.

Slip-Shod Wiring

A $10,000 machine tool was shown in a recent advertisement having two 25-horsepower, high-slip, frequent-reversing type motors and two smaller motors; a beautiful job, with only $13.86 worth of electric wiring, consisting of flexible conduit draped along on the outside of the frame of the machine, connecting the push-button stations which were mounted on unprotected brackets screwed on to the frame and finally, to the starters. I feel strongly that there is a lot that can be done to give the purchaser of the machine tool a wiring job that is permanent, rigid, trouble free and presentable in appearance.

The evidence is strong that ma-

*Abstract of paper presented at the second machine tool electrification forum held April 19-22, 1937, under the auspices of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.



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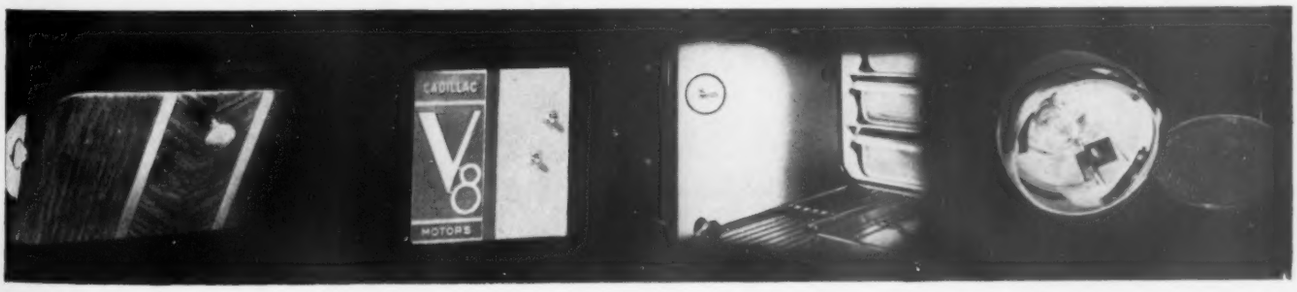

chine-tool manufacturers have not extended their design or responsibility to include wiring. The National Electric Manufacturers association did a great thing for the trade when they developed the NEMA motor frame. Now, perhaps, it is time to do something about the mechanical dimensions of control devices, so that a machine tool designer may prepare a suitable place for a starter without tying himself down to one particular make.

The purchaser usually has fixed ideas as to the motor and control he wants to use and the machine tool salesman is not going to combat this idea, his job being to sell machine tools and not electrical equipment, so if National Electric Controller association controllers were available, this problem would be relatively simple. But even without this regimenting of control dimensions, the machine tool designer can do a lot toward a complete and much better application of power by actually planning for it, and I think this is the key to the situation.

Switchboard manufacturers not so long ago, offered us a beautiful tombstone slab of marble on which we could mount certain devices and with the assistance of a factory superintendent and a troop of workmen, actually build in a course of a month os six weeks a mechanism on our own premises that functioned to connect and disconnect electric power. For the metal press plant referred to above, we purchased a modern steel-panel switchboard, completely fabricated and wired at the factory, which required only three days' work for three of our own men to erect and put into service.

When we receive a machine tool, as usually shipped today without wiring, a lot of time and money is always lost in getting it into service, because the electrician has to find out from the production department just where the operator will stand, where he can have his control, his push-button station, etc.; then he has to do a blacksmith's job of mounting the equipment to satisfy this demand. This then is followed by a flexible conduit job on the outside of the machine because there is not time or means to do a rigid conduit job inside the frame.

A high-grade wiring job, from my point of view, should be made a rigid conduit one as far as at all possible. Flexible wires or cables should be used even in small wire sizes, with proper terminals and fasteners well located and supported. The wiring should be done with coded or colored wires as this is a great help in "trouble shooting". The conduits should be within the frame of the machine wherever possible, even the expense of cored openings in the machine castings for conduit and recessed spaces for push buttons, hinged-door openings for controllers, etc., would not seem to me too great an expense to make a complete machine tool.

Purchasing Agents' Convention Will Survey Trends in Metal Markets

INDUSTRIAL purchasing executives will attempt to chart probable trends of commodity prices through uncertainties of the months ahead when they meet in Pittsburgh, May 24-27, for the twenty-second annual convention of the National Association of Purchasing Agents.

Although the organization will make no official forecast, business executives will watch closely the discussions of specific commodity markets which will feature the four-day gathering at William Penn hotel.

Buying policies are influenced by facts brought out at the convention. For the last several months, the business survey committee of the association has been sounding a note of caution on forward commitments and has emphasized that fall business trends as yet are uncertain.

Among specific commodities to be dealt with at convention sessions are copper, tin, lead, zinc, aluminum, petroleum, coke and other by-products of coal. More than 89 companies which furnish raw materials and finished goods to industry will be represented with exhibits in the show sponsored by the association.

Portions of the meeting program of interest to the metalworking industry are as follows:

Monday, May 24

MORNING

General Session

Report of secretary-treasurer, by G. A. Renard.

"Business Conditions and Price Trends, with Recommended Purchasing Policy," by Fred J. Heaslip, purchasing agent, Fairbanks, Morse & Co., Chicago.

"Industry's Problems and Program as a Government Economist Sees Them," by Leon Henderson, economist, works progress administration, Washington.

"Industry's Problems and Program as an Industrial Executive Sees Them," by Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt.

AFTERNOON

General Session

"Copper," by Albert E. Petermann, vice president, Calumet & Hecla Consolidated Copper Co., New York.

"Tin, Lead and Zinc," by C. S. J. Trench, editor, *American Metal Market*, New York.

"Purpose and Plan of Proposed N.A.P.A. Purchasing Handbook—General Purchasing Policies," by Donald G. Clark, comptroller, Brown & Sharpe Mfg. Co., Providence, R. I.

EVENING

Joint Session Governmental Purchasers and Educational and Institutional Buyers Groups

"Aspect of Public Budgeting as Related to Governmental Purchasing," by Carl H. Chatters, executive director, Municipal Finance Officers' association, Chicago.

"Ramifications of the Robinson-Patman Act."

Iron and Steel Session

Discussion of the steel industry, by J. H. Van Deventer, editor, *Iron Age*, New York; and Benjamin F. Fairless, president, Carnegie-Illinois Steel Corp., Pittsburgh.

Tuesday, May 25

MORNING

General Session

"Refractories," by Dr. John D. Sullivan, chief chemist, Battelle Memorial institute, Columbus, O.

"Coke and Other By-Products of Coal," by C. J. Ramsburg, vice president, Koppers Co., Pittsburgh.

AFTERNOON

General Session

"Petroleum and Its Products," by Dr. Paul D. Foote, executive vice president, Gulf Research & Development Corp., Harmarville, Pa.

"Aluminum," by S. K. Colby, vice president, Aluminum Co. of America, Pittsburgh.

"Price Trend Summary," by H. N. McGill, president, McGill Commodity Service Inc., Auburndale, Mass.

EVENING

Coal Session

"Coal Classification and Selection," by H. J. Rose, industrial fellow, Mellon Institute of Industrial Research, Pittsburgh.

Wednesday, May 26

EVENING

Annual Banquet

Toastmaster: Arthur G. Hopcraft, purchasing agent, Cleveland Worm & Gear Co., Cleveland.

Presentation of medals and awards.

Thursday, May 27

MORNING

General Session

"The Commodity Market," by A. W. Zelomek, president, International Statistical bureau, and economist, Fairchild Publications, New York.

"Contribution of Research to Industry," by Dr. Garson Meyer, material and process research department, Eastman Kodak Co., Rochester, N. Y.

"Where Do We Go From Here?" by Dr. Neil Carothers, director, college of business administration, Lehigh university, Bethlehem, Pa.

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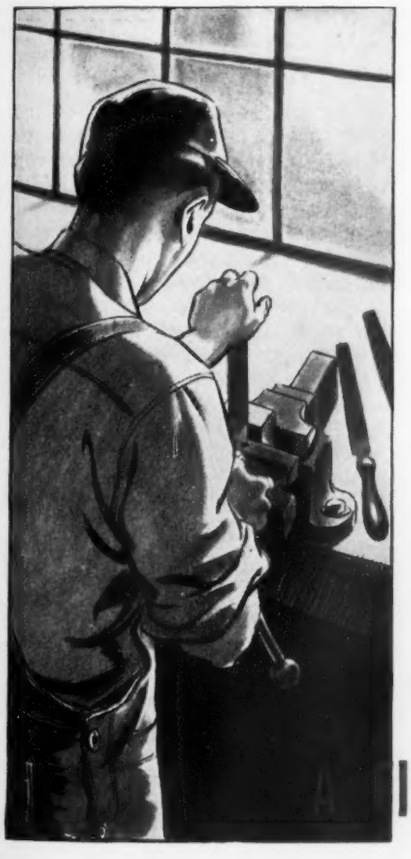

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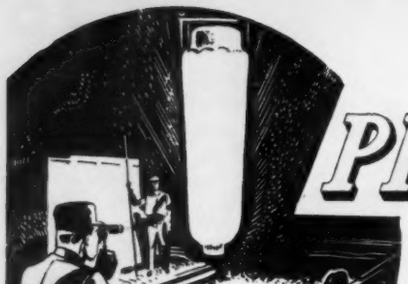


PROGRESS IN STEELMAKING

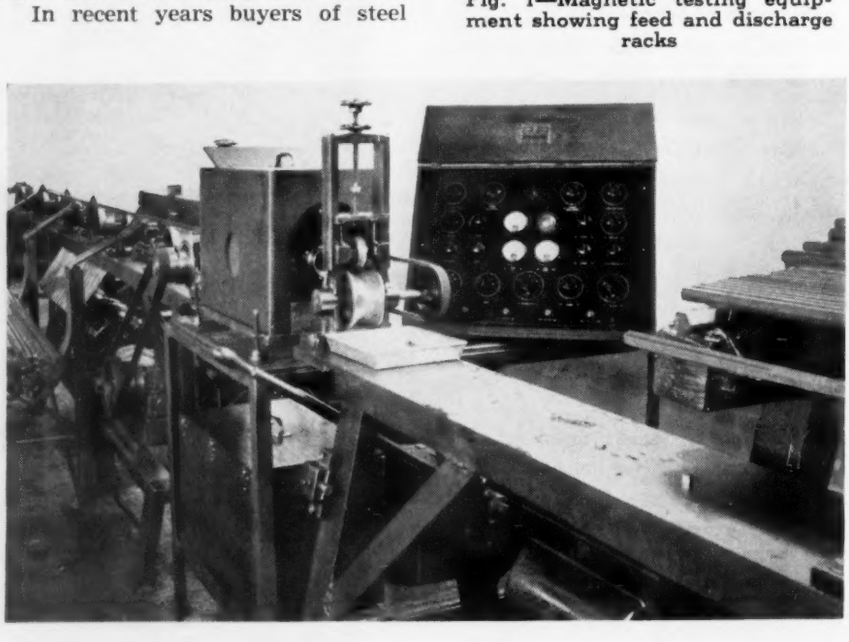
Cold Drawn Steel Is Inspected by Nondestructive Method

BY R. K. SCHRECONGOST

MAGNETIC testing of cold drawn steels for defects and mixed analysis is a comparatively new science, first employed by the Union Drawn Steel division of Republic Steel Corp. approximately four years ago. This method of nondestructive inspection insures the steel user a minimum scrap loss due to defects which cannot be seen by the common method of visual bench inspection and which often are not visible until a great deal of work has been put on the steel. Although the first magnetic testing equipment installed was far from perfect numerous improvements have been made until the equipment of today is in no respect similar to the original, and is much more efficient and reliable.

In recent years buyers of steel for machining purposes have learned the advantages of cold drawn steel, and consequently the demand has risen to such an extent that competition has developed and become so keen that only the consistent producer of quality steel holds any advantage. These reasons coupled with the fact that cold drawn steels are usually subjected to most severe cold working operations, such as cold heading, cold bending, and heavy cutting, gave rise to the need for some practical method of nondestructive inspection.

Fig. 1—Magnetic testing equipment showing feed and discharge racks



Magnetic testing has met this requirement so thoroughly that it is destined to become a permanent part of cold drawn steel production.

With this equipment, which was built by the Magnetic Analysis Corp., Long Island City, N. Y., two methods of testing are employed, each independent of the other yet both working simultaneously. One is called the standard method for separating mixed grades, and the other the special method for finding defective bars.

Outline of Method

Using the standard method as shown in Fig. 2 each bar passes through a magnetic induction coil with a primary winding and a secondary winding, the induced secondary current being bucked to a constant current value which has been established from a correct analysis sample at the start of operation. Any inequalities of the two opposed currents can be compensated by means of a suitable resistance so that a zero reading can be obtained and held for comparison purposes. The induced current depending primarily upon the permeability of the steel, and each grade of steel having a different permeability, it can be seen how a change from the proper grade will cause an unbalanced condition. This method also was used originally for finding defects, due to the fact that seams, cracks and other defects caused various changes in permeability. However, it was not sufficiently sensitive to pick out small defects, nor selective enough to offset the peculiar variations within bars of like grade and heat, so a

better method was devised, called the special method.

The special method, as shown in Fig. 3, employs the same primary winding as the standard method, but it has also two other secondary windings connected in opposition within the same coil, and spaced about 6 inches apart. By this arrangement, one section of a bar passing through the coil actually is compared with another section 6 inches away, thereby indicating any differences of structure that occur along the length of each individual bar. It is apparent that if defects

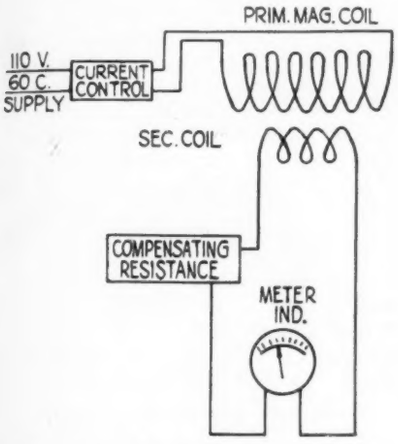


Fig. 2—Standard method circuit used for separating mixed grades of bars

are to be found, they must vary in intensity, which they invariably do. Only in rare instances does a defect run uniformly from one end of the bar to the other.

In setting up for the special method, the operator uses a perfect specimen bar free from all defects and uniform throughout, which is inserted in the coil. Any unbalanced currents coming from the two bucked secondaries are compensated by suitable resistances similar to those of the standard method. When this is done, the equipment is ready for testing. Any deviation in the meter thereafter, calls for an investigation to determine the cause. If the defect is not visible, a ring is filed entirely around the bar to break the skin or surface. This usually exposes the defect.

With both methods, the resulting secondary currents are taken to a meter panel, shown in Fig. 4, where they are measured on micro-ampere meters (meters measuring 0.001-ampere). These meters respond to changes quickly but not fast enough to record short defects at the inspection speeds necessary in production. For this reason there is connected in parallel with the special method meter a glow discharge tube operating a time delay circuit and neon light indicator, which records changes instantaneously. An amplifying system is used to increase the volume of signals and resistance controls give a wide range of sensitivity making the equipment flexible.

The current supply to the primary windings is alternating 60 cycle, setting up an alternating magnetic force which produces in turn an alternating magnetic flux, and alternating electric currents (eddy currents) inside the bar. The resistance of the molecules to the alternating flux results in the hysteresis loop, giving three factors. (1) The magnetic flux, (2) the eddy currents; (3) the hysteresis loss, all of which determine the value of the current induced in the secondary windings. Each of these three may have their separate effects on the amplitude and phase of current induction, but they are so interlocking that it cannot be said definitely what defect in a bar will cause any particular change in any one or any combination of the three.

For example, imagine a light seam of 0.010-inch depth which effects no strain relief and will certainly not effect any reduction in cross section area. We readily can see there would be no reduction in flux density nor any effect on the hysteresis loop. But what about the eddy currents? In their course around the bar, any interruption or break in the surface would interrupt their flow, thereby changing the induced secondary current. If the same seam were increased to 0.025-inch depth, relieving the surface strain and changing the permeability, all three factors would change.

Magnetic testing is often mistaken for some method of demagnetizing. This can be understood easily since little has been said about magnetic testing up to date. It does in some cases reduce the magnetism found in bars, but it was not designed for that purpose.

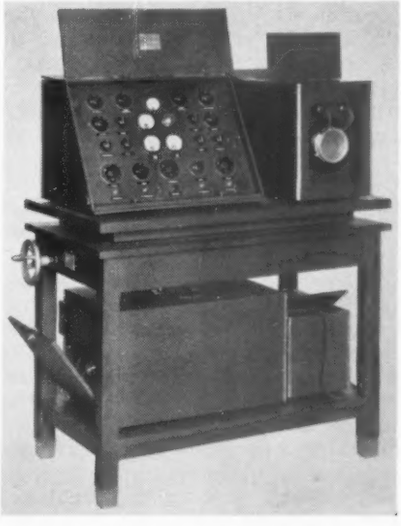


Fig. 4—Panel equipped with micro-ampere meters for measuring secondary currents

The most common defects which are found by Magnetic Testing are as follows:

(1) Seams—The minimum depth of seam to be found depends much upon the amount of strain within the bar, whether the strain is periodic or intermittent, and whether the seam is deep or shallow, tight or open, the average depth being 0.010-inch or over.

(2) Cracks — Cracks readily are identified as they are more

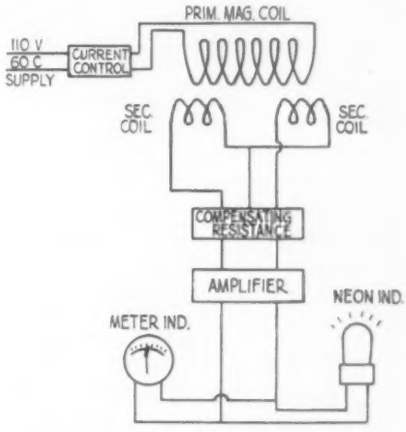


Fig. 3—Special method circuit which is used for finding defective bars

severe and radically change all three factors of the magnetic field as mentioned before.

(3) Laps and Shearing—Shearing often gives no indication on the magnetic machine, but laps over 0.010-inch depth are indicated plainly.

(4) Slivers—Slivers of a few thousands depth have no effect, but when they originate with a seam or lap the indications show accordingly.

(5) Roll marks or irregular cross section—Occasionally bars are found by Magnetic Testing which have spirals resulting from excessive pressure in straightening methods. Care must be taken not to produce surface strains above those necessary for commercial straightness.

(6) Porosity — Pipe — Segregation —These three defects as yet have no regular determined indication on the machine. This can be explained by the fact that an alternating current does not produce a fully penetrating magnetic flux in bars over ⅝-inch or ½-inch diameter.

Certain factors of operation must be held to if best results are to be obtained from the equipment:

1—The current supply must be uni-

(*Please turn to Page* 80)

Porcelain Enamel Forum Stimulates Interest in Improved Shop Practices

NECESSITY for extreme care in selecting proper enameling stock and porcelain enamels; design of parts; preparation of surfaces; elimination of as much hand handling as possible; and proper firing procedure were emphasized at the first annual Porcelain Enamel institute forum held May 5-7 at the University of Illinois, Urbana, Ill. Approximately 150 men engaged in enameling work and in supplying enameling materials and metals participated. About 60 students and instructors of the ceramics department of the university also attended.

Because of the interest shown, institute directors announced annual continuance of the forum with meetings alternating between the University of Illinois, and Ohio State University, Columbus, O. Growing interest in the ceramics industry and its need for trained men was indicated by the revelation that enrollment in the ceramics department at Illinois has increased from 83 students in 1929 to 214 at present.

Outlines Forum Purpose

Discussing the purpose of the forum, R. G. Calton, vice president, Tennessee Enamel Mfg. Co., Nashville, Tenn., and president of the institute, called attention to improvements in enameling practices and products since enameling has progressed from the "secret formula" days to the present with its open exchange of ideas, research and more or less standardized practices. Since much of the success of enameling depends upon application practices, the forum emphasized the need for men to meet occasionally to discuss their problems. "With exchange of ideas, companies grow and the industry grows," asserted Mr. Calton.

To prepare college graduates more quickly to take their place in industry, Mr. Calton advocated establishment of "interneships" in manufacturing plants so that for a period of a year or so undergraduates and graduates might be shifted around through various departments to become familiar with shop practices.

Reviewing progress of the enameling industry during the past year, Emerson P. Poste, president, Poste Testing Laboratories, Chattanooga, Tenn., mentioned wider interest and co-operation shown in forums; establishment of local groups and training courses for study of plant problems; increased laboratory facilities; more extensive use of the microscope, and a greater amount of research in the theoretical and scientific principles of enamels and their application.

Progress Is Reviewed

Considerable progress was reported in determining the factors in the relationship between the surface to be coated and enamel adherence. Mr. Poste attributed a large proportion of enameling troubles to improper preparation of parts. Some studies, he said, indicate that raising temperatures in pickling and cleaning operations to increase output is more successful than increasing the percentage of acid.

Wider use of automatic spraying, pickling and handling equipment, radiant tubes for continuous furnaces and automatic gas analyzers were mentioned. Mr. Poste called attention to the increased requirements of higher quality, greater durability, particularly on surfaces exposed to the weather; better design to simplify enameling problems, and improved appearance in enameled work. In his opinion, future demands will be even greater.

Among new or growing uses of enameled products, he referred to porcelain enamel buildings and interior finish, enameled kitchens for trailers, plywood faced with enamel, enameled roofing, and enameled articles for art and beauty.

Discussing some of the fundamentals of porcelain enamel, Prof. C. W. Parmelee, director, ceramics department, University of Illinois, pointed out that although glass-coated stones date back to about 5000 B. C., real research on enamels has been made only within the last few years. The fact that the raw materials, the fluid enamel in process and the final brittle glass differ so greatly in all physical characteristics has complicated research.

Because of the complexity of enamel composition, basic studies were made in glasses of different composition as a basis for determining fundamental laws and methods and later the modifications applying to porcelain enamel materials, Prof. Parmelee said. Research was carried on to determine laws governing change of surface tension, modulus of elasticity and viscosity with temperature changes; thermal expansion; scratch hardness; tensile strength; fracture characteristics; and X-ray diffraction patterns.

Would Standardize Tests

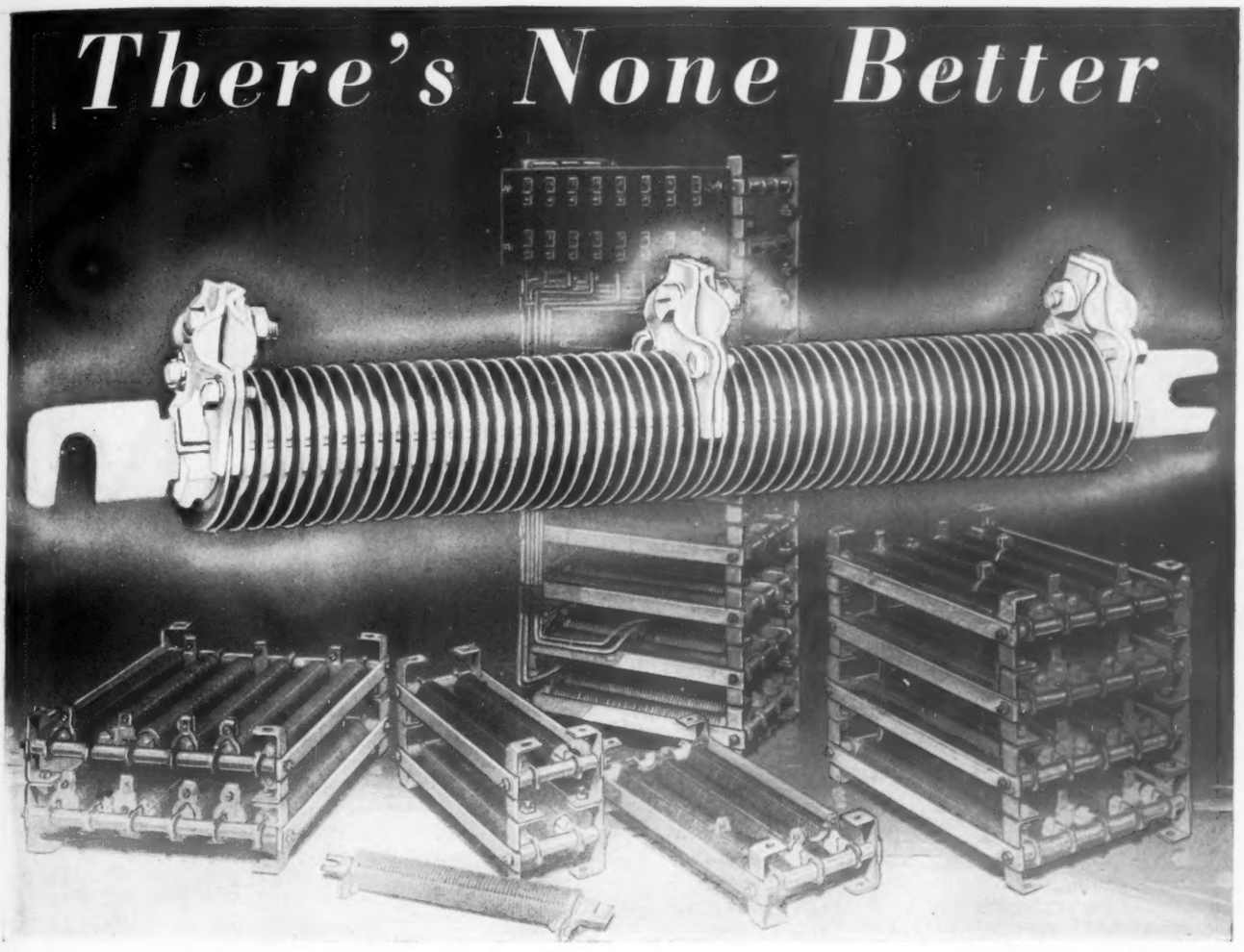
W. N. Harrison, in charge enamels division, national bureau of standards, Washington, stated that work of the bureau seeks to establish standardized tests of products whereby different samples can be compared and rated in such a way that results will be beneficial to manufacturer, dealer and user. Tentative standard tests on reflectance and acid resistance have been completed. Specifications for the latter were distributed with request for trial and reports on results.

Mr. Harrison emphasized that the tests covered only acid resistance and not alkali resistance and that in the opinion of the bureau, no porcelain enamel could be classed as "stainless" unless it passed both acid and alkali tests.

"Black hairlining, which is more troublesome than white, results from improper design, faulty fabrication, or from the ground coat," stated E. C. Greenstreet, Standard Gas Equipment Corp., Baltimore. "No rules apply to all cases but the designer should follow the best practices in regard to double-thick metal, flanges, cut-outs or thin sections. Hairlining due to improper forming, may be caused by faulty dies as excess metal or thin spots invite warping and hairlining. Best results can be obtained by using steels which draw without strains or distortion."

In general, a tougher ground coat has greater resistance to hairlining, the speaker contended. Other precautions mentioned were: Avoid pil-

There's None Better



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(Write for Bulletin No. 111)

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ing up coatings at openings; use lower temperature and longer firing of the ground coat; avoid heavy spraying on convex or concave surfaces; avoid excessive cut-outs. The opinion was expressed that hairlining depends upon dry bisque strength; if dried too fast, a crust is formed which is not flexible when fired.

In continuous furnaces, hairlining has been attributed to hanging work too close. In one instance related, increasing the spacing cured a case of hairlining even though fired more rapidly. Double-faced work should be spaced at least 10 to 12 inches apart.

"An understanding of the problems incidental to transportation and preparation for them in design, packing or crating and loading would materially reduce losses of enamelware in transit to the mutual benefit of the shipper, carrier and user," stated Howard A. Wetter, loss and damage claims, Chicago & North Western railroad, Clinton, Iowa. A study of 4172 stove rejects indicated that faulty design might be more responsible for some of them than damage in handling, he said.

Preventing Shipping Damage

Ordinary transportation risks enumerated by the speaker consist of (1) trucking and stowing, handling and crushing (2) vehicle movement, truck or car, which consists of vibration, end-to-end or shifting, and side-to-side or swaying movements. Careful attention to the design and construction of the package or crate will prevent a large proportion of these losses, Mr. Wetter maintained.

Some of the suggestions offered were to eliminate loose or projecting parts, cushion and protect finished surfaces, use crating material of sufficient size and quality to prevent splitting, adequate nailing, lock corners, adequate base, and proper x-members to reduce the effect of twisting and swaying movements. Light packages are extremely difficult to stow safely. Keep nested articles apart and protected, Mr. Wetter cautioned.

Packages too heavy and large for manual handling should be avoided because of difficulty in handling without damage and because of the probability of crushing or damage to units at the bottom. Damaged packages should be studied to determine the nature and location of damage so that packing methods can be improved. Transit inspectors can offer suggestions from their experience and should be called in, Mr. Wetter said.

Too few mills is poor economy because material is wasted and washing and cleaning time becomes excessive, stated E. C. Aydelott, superintendent enamel plant, Benjamin Electric Mfg. Co., Des Plaines, Ill. Too much emphasis, he stated, cannot be placed on cleanliness. Mills must be dumped and thoroughly cleaned for all changes, even from plain white to acid-resisting white.

Other points were stressed by Mr. Aydelott. Determine the best speed for each diameter of mill to obtain the proper relation of tumbling and rolling action, he advised. Enamel may emerge from the mill warm but not hot, as excessive temperature affects the product. Keep a record of each loading. Relining changes conditions; as the lining wears, the charge may be increased but must be again decreased on relining. Establish milling standards for your own plant for each type of work.

"Good shop housekeeping is necessary for safety, efficiency and successful enameling, not only in the enameling room but in all departments that handle the work both before and after enameling," according to W. H. Pfeiffer, in charge materials and research laboratory, Plant No. 2, Frigidaire Corp., Dayton, O. "Objectionable dust or fumes may come from other departments; adjacent grinding and plating rooms are the worst offenders. Even dry dust settling on wet enamel may cause trouble. Forced circulation of clean air with the enameling department under slight pressure offers the best solution of the outside dust or fume problem.

"Use of conveyors, which eliminate many rehandlings, as well as permit keeping a cleaner shop, has a pronounced effect on the quality of the work." Still other important points related to housekeeping, as mentioned by Mr. Pfeiffer, were: Sheets at the bottom of the pile deteriorate; use two piles. Where workers handle different metals separate sandblasts should be employed. It is advisable to separate sheet and cast iron enameling departments.

Some Difficulties Encountered

Rust in steam coils to the cleaning tanks cause trouble, he pointed out. Inspect agitator shafts frequently for excess oil or grease. Low humidity of outside air admitted to the department in extremely cold weather results in excessive drying of wet enamel. Humidity of the dryer sometimes requires control.

Six major factors affect the efficiency of enamel spraying operations, was the opinion expressed by Wesley G. Martin, A. O. Smith Corp., Milwaukee. These are the enamel, enameling method, spray gun, enclosure, type of ware and wages or incentives. Some operators maintain their efficiency better than others but all have their poor days.

Where large surfaces are to be covered, automatic spraying equipment is the only practical method of obtaining absolutely uniform coating day after day, he maintained. All spraying equipment must be inspected to see that air ports do not clog and spray with imperfect pattern. An ample supply of spare guns and parts and a mechanic trained in their repair is profitable.

Ample lighting, carefully regulated ventilation and conveyors where applicable to free the operator of excess motions, increase output and improve quality of work. Complexity of surface affects the rate of spraying but should not affect quality. Wage incentives should be applied to the individual rather than to the group and every facility provided to enable the men to do more, Mr. Martin recommended.

Discussion brought out the desirability of providing respirators which the men can wear at all times in preference to those which the men will use only when the foreman approaches. Masks with an air supply are safer and not so tiring to operators as when they must pull the air through a respirator. One company reported adding a 1-horsepower ventilating fan to the spray booths and obtaining sufficient ventilation to permit workmen to dispense with masks. Furthermore, the compensation insurance rate was lower. Extra baffles in ducts collect excess enamel and reduce losses.

Smaller Furnaces Needed

"Today there is a definite need for gas or oil-fired continuous furnaces in the smaller sizes for use in the small shop or to place alongside large units for small work," according to F. S. Markert, Ferro Enamel Corp., Cleveland. "Such furnaces necessitate better knowledge of fuel, combustion principles, burners and firing methods."

Application of the radiant-tube type of heating to enameling furnaces was mentioned as the outstanding recent development. This type of furnace was stated to have an efficiency 15 to 20 per cent greater than muffle-type units. Because of the intense heat, expected tube life still is a question. Still greater improvements in furnace design and application of heat may be expected within the next few years, it was prophesied.

The question as to the use of insulating refractory linings was brought up in the discussion. One spokesman related that with rapid entry of large work the insulating lining does not have sufficient retained heat for the necessary "comeback" to compensate for the cooling effect.

"Managements are pressing for the production of one cover coat work because of a 20 to 30 per cent reduction in cost and less space re-

(*Please turn to Page* 78)

SURFACE TREATMENT AND FINISHING OF METALS

Tinning of Steel Strip By Electrodeposition

POROSITY was next considered. Tests were confined to the smooth matte deposits obtained with the acid process since, as later figures will show, this type of coating shows the greatest possibilities of success. It was found that polishing which produced a 12 per cent loss in weight in this type of coating doubled the original porosity of the coating. Scratchbrushing gave varied results with the weight loss varying from 2.5 to 7 per cent and the porosity increase varying from 100 to 400 per cent. There was an exception again in the case of the specimens which had been scratchbrushed with brass wire. The porosity increase was slight and the protective value of the coating was not markedly affected.

A porosity study would not be complete unless it included the effect of work stressing, since tin coated steel is almost invariably subjected to deformation when undergoing fabrication.

In Macnaughtan's tests two grades of tin plate were used. One had a coating of tin approximately 0.00012-inch thick (about 2 pounds tin per base box) and the other a coating approximately 0.0003-inch thick (about 5 pounds tin per base box). Portions of these tinned sheets were retained to provide specimens of hot-tinned coatings for comparison with electro-tin coatings. The first step in the preparation of the latter was to strip the tin from the sheets and remove the exposed iron-tin compound by scrubbing with fine pumice powder. Tin was then electrodeposited from both acid and alkaline baths to give coatings of approximately the same thickness as the hot-dipped tin coatings. For the production of composite tin coatings only the alkaline bath was used and tin was applied so that the ratio of electrodeposited tin to hot-dipped tin was 1:3. The total thickness was the same as the other specimens.

The tinned specimens were sub-

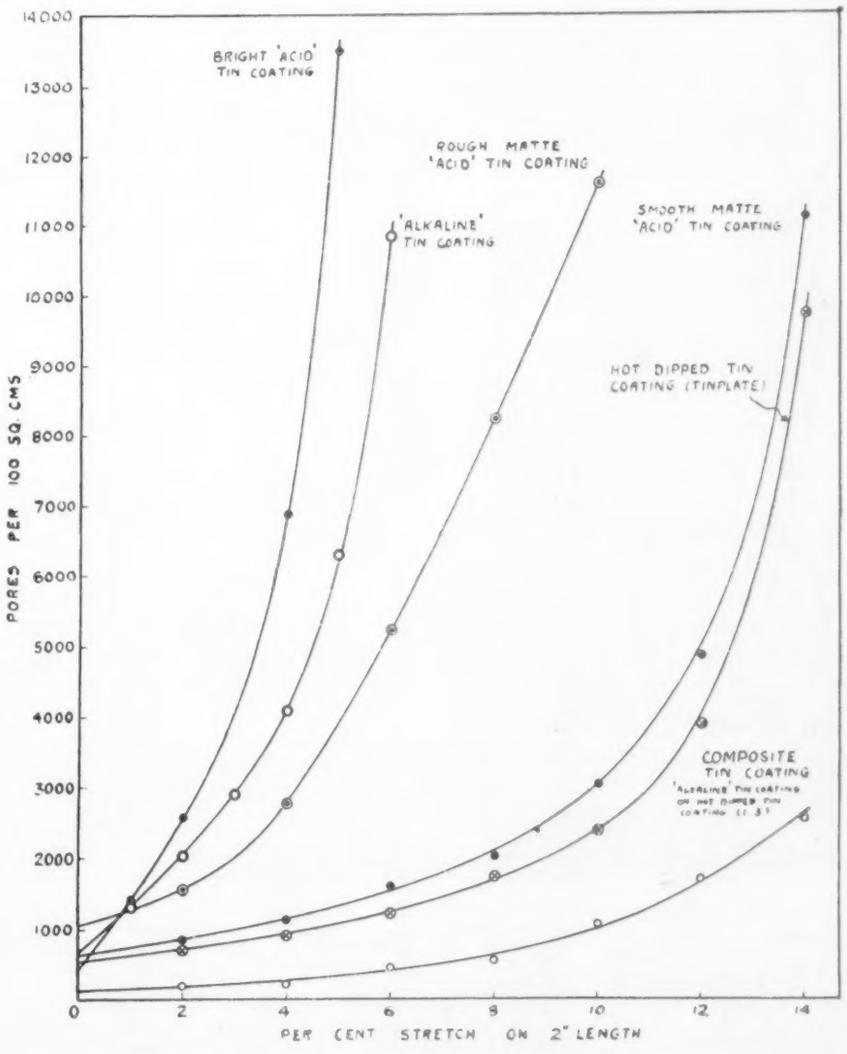


Fig. 1—Illustrating the effect on porosity of stretching tin coatings approximately 0.0001-inch thick on mild steel approximately 0.1-inch thick

jected to two deformation tests—stretching and close bending. For the stretch test a number of strips 2 inches by ½-inch were cut and stretched to a definite degree in a testing machine. The porosity of the coatings was observed on each of the stretched and unstretched specimens. The "hot water" method of determining porosity was used in each case. In the close bending test specimens were first bent over a piece of steel sheet 0.01-inch thick. The wings of the bend were then squeezed tightly in a vice over this same sheet. No contact occurred between the jaws of the vice and the area subjected to close bending. None of the specimens tested in this manner were polished or scratch-brushed.

Pores Are Counted

The method of determining and comparing porosity was to count the number of pores in a definite area with a low-power microscope after treating the specimens with the hot water test. The area in all cases was 100 square centimeters.

The first specimens tested were those with the 0.0001-inch coating. The average value of the porosity of the unstretched specimens was as follows:

	Pores
Hot-dipped coating (tinplate)	616
Alkaline tin deposit	646
Composite tin coating	98
Rough matte acid tin deposit	1034
Smooth matte acid tin deposit	530
Bright acid tin deposit	393

The effect of stretching on the porosity of the coatings applied by the various methods, shown graphically in Fig. 1, reveals striking differences in behavior. The order of merit of the coatings with respect to resistance to increase in porosity with stretching are as follows:

1. Composite tin coating (1:3 electrodeposited tin; hot-dipped tin).
2. Hot-dipped tin.
3. Smooth matte "acid" coating.
4. Rough matte "acid" coating.
5. "Alkaline" tin coating.
6. Bright acid tin coating.

It is to be specially noted that the behavior of the composite coating was superior to either of the two types alone. The composite, hot-dip and smooth matte acid coatings show only a moderate increase in porosity on stretching up to 5 per cent or less while the other three types show a remarkable increase before stretching reaches 5 per cent. It is thus definitely shown that lack of porosity in the original coating is not a definite indication of quality.

THIS is part II and the concluding installment of an article discussing progress made in the continuous tinning of steel strip. Part I, which appeared in the May 3 issue of STEEL, included a general description of methods of application. Part II continues with a discussion of physical properties

The results of the deformation tests revealed striking differences which are consistent with the differences shown in the stretching tests. The bright acid and alkaline coatings revealed severe local vertical fissures which occurred without any perceptible reduction in thickness, indicating brittleness. The rough matte acid coating showed some ductile stretching. The other coatings stretched to a marked degree and the steel base metal was exposed only in a few isolated areas.

Specimens Fall Into Two Groups

The specimens with the 0.0003-inch coating fell into two groups as in the case of the thinner coatings. The average values of the porosity of the tin coatings on the unstretched specimens were:

	Pores
Hot-dipped coating (tinplate)	156
Alkaline tin deposit	32
Composite tin coating	5
Rough matte acid tin deposit	200
Smooth matte acid tin deposit	42
Bright acid tin deposit	40

The lower porosity values are to be expected and need no further discussion except to point out the low original porosity values of the alkaline tin, and bright acid tin coatings. The effect of stretching these coatings is shown graphically in Fig. 2, revealing the same two groups as before. It is to be noted that while the original specimens of alkaline and bright acid dip tin coatings had a low porosity count, there was little or no improvement in their resistance to stretching. On the other hand, all other types of coating showed a marked improvement. Of particular interest is the fact that the hot-dipped coating and the smooth acid matte coating behave in a very similar manner with the former only slightly superior to the latter.

The close bending tests confirmed the results of the stretching tests in every way. The composite, hot-dipped and smooth matte coatings stretched in a ductile manner in bending. Exposures of the steel base occurred only at the sites of pores and other local discontinuities in the original surface of the coating.

From the results of the above work it is evident that the alkaline

(*Please turn to Page* 82)

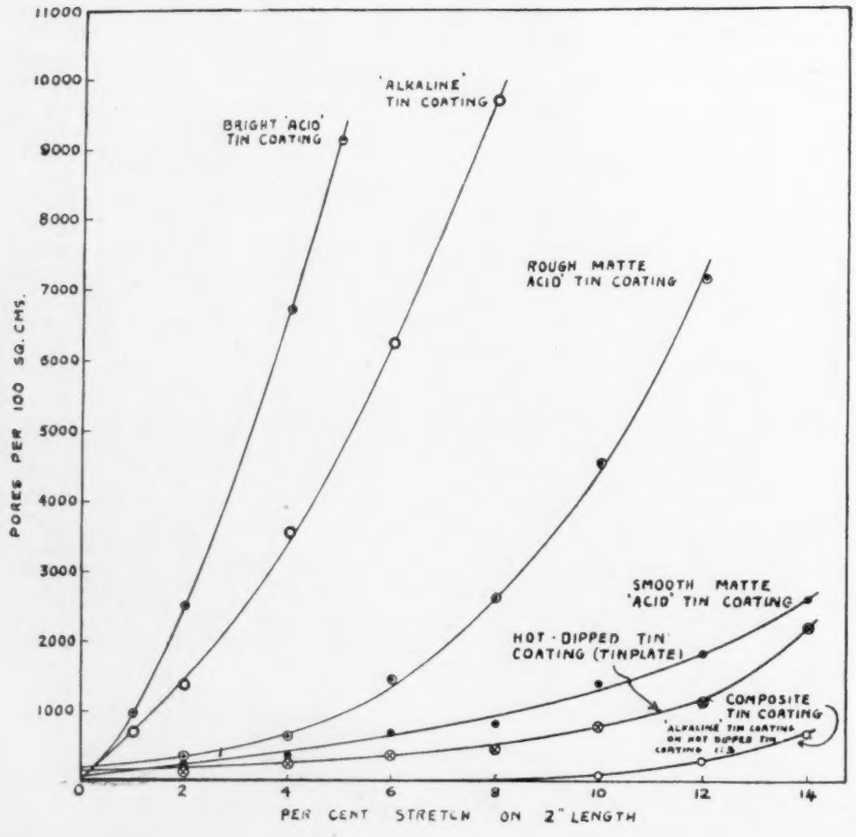
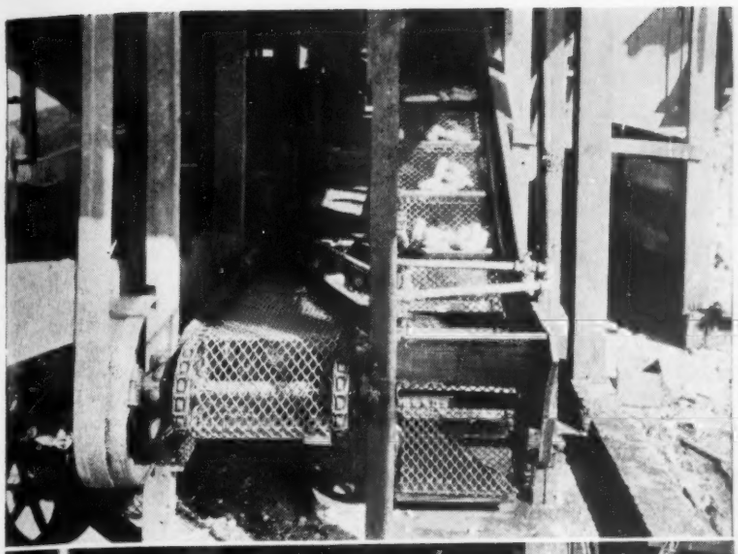
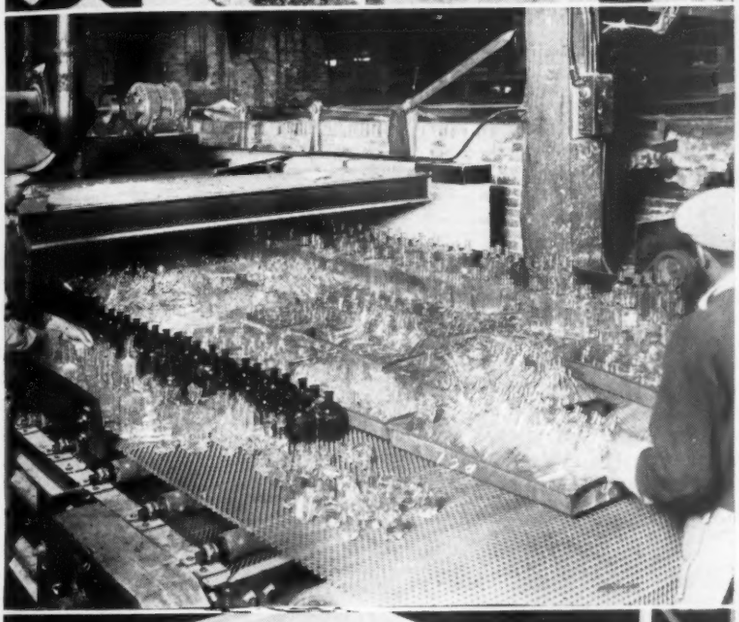
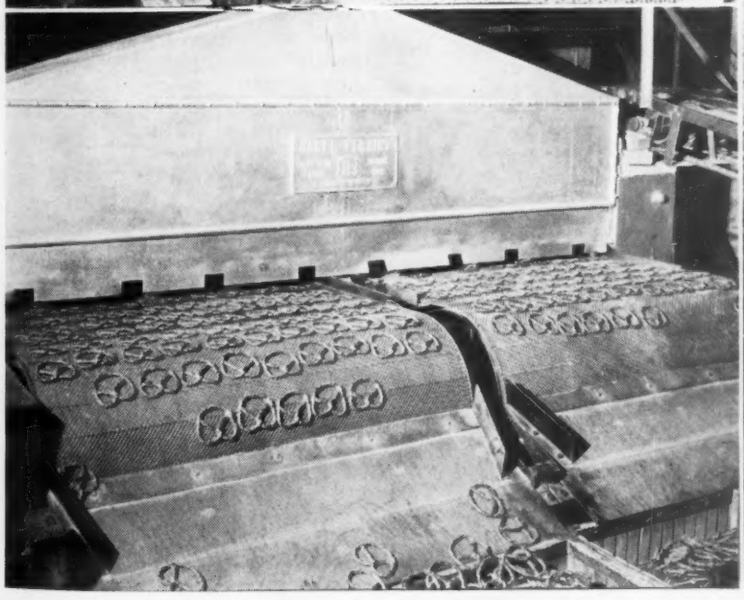
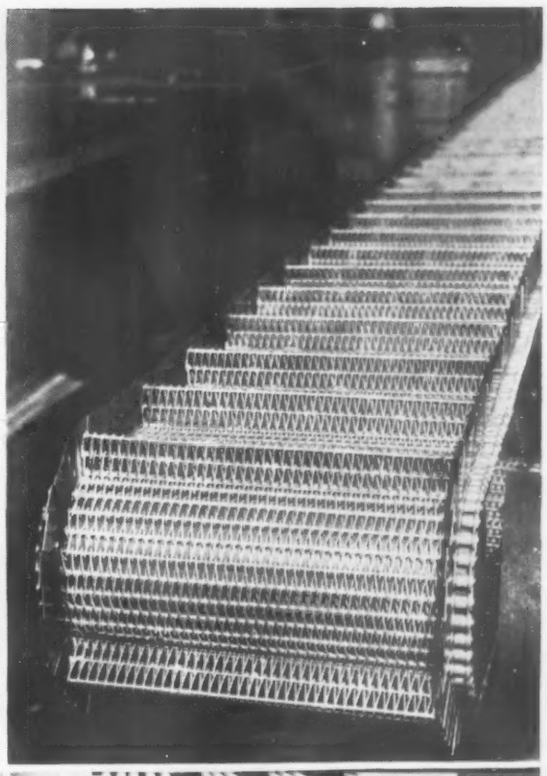

PORES PER 100 SQ. CMS.
PER CENT STRETCH ON 2" LENGTH
'ALKALINE' TIN COATING
BRIGHT 'ACID' TIN COATING
ROUGH MATTE 'ACID' TIN COATING
SMOOTH MATTE 'ACID' TIN COATING
HOT-DIPPED TIN COATING (TINPLATE)
COMPOSITE TIN COATING
'ALKALINE' TIN COATING ON HOT DIPPED TIN COATING 1:3

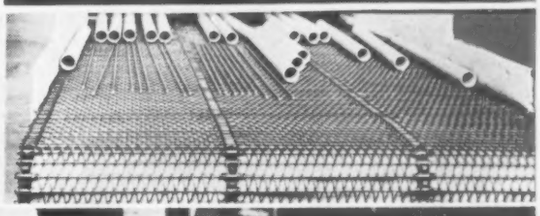
Fig. 2—Illustrating the effect on porosity of stretching tin coatings approximately 0.0003-inch thick on mild steel approximately 0.1-inch thick

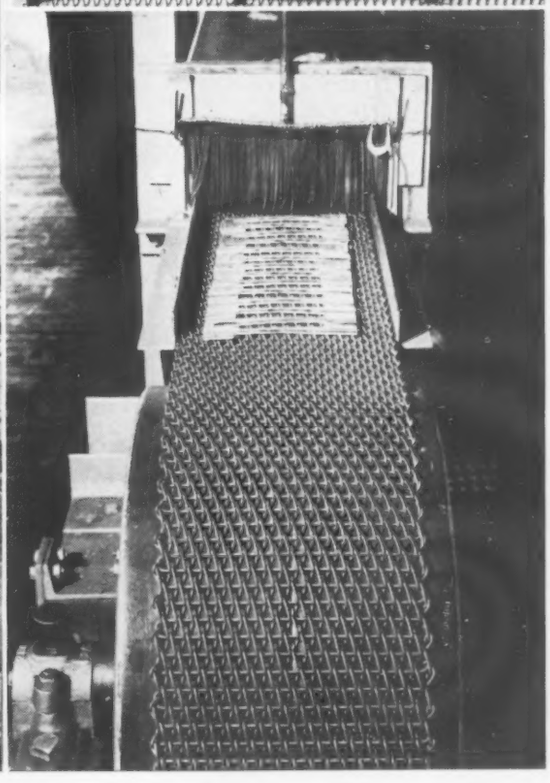












CAMBRIDGE MESH BELTS CAMBRIDGE WIRE CLOTH COMPANY belts handle everything from pretzels to silverware. Top left—Drive chain belting handling corn on the cob. Right—Belting with wire cleats, metal side plates for handling materials up incline. Center left—Lehr belting for annealing and decorating glassware. Center right—Drive chain belting for annealing at 1100 F. Bottom left—Reinforced belt for baking pretzels. Right—Stay rod belting for soldering silverware at 1400 F.

CAMBRIDGE WIRE CLOTH COMPANY
WASHINGTON BLVD., CAMBRIDGE, MARYLAND

WELDING, ETC.

BY ROBERT E. KINKEAD

Advisable Forms of Hedging With Welding

IN this column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL

AS THE margin between cost and selling prices tends to decrease many manufacturers are turning to development of their welding activities as a means of holding costs down. The theory that this desirable end is accomplished by calling in a welding machine salesman and giving him an order for a welding machine costing less than a thousand dollars is not borne out by experience. Hedging against rising manufacturing costs by use of welding involves a day in and day out, month in and month out pursuit of savings by extensive changes in design and manufacturing methods. It requires organized and constantly supervised effort to accomplish the savings that have been made, for instance, by the crane, power shovel and road building machinery industries. But these savings have resulted in very profitable operations where otherwise there would have been loss.

Another form of hedging with welding is in capital investment. The new factor in investment which has to be taken into account under present conditions is the probable decrease in purchasing power of capital. A sum of money invested in first mortgages yielding 4 per cent net with safety and payable in five years may have half the purchasing power when it is returned in five years. This situation is not only possible—it is probable. On the other hand, capital invested in welding processes, equipment, or well managed companies may double or treble in value, thus offsetting the probable decrease in purchasing power of money. There are examples in the welding industry of increases in capital of five to ten times in which periods of both depression and inflation have been spanned, so that the idea is not by any means academic.

Wealth is created by rapidly developing industries where technical knowledge and invention form the basis of commercial activity. Welding (there are 12 different processes) is just beginning to be recognized. In the matters of total capital invested, number of people employed, the welding industry will eclipse the steel producing industry itself within ten years. The proof of that is easy to find. Fabricated steel which sells for say 8 cents per pound costs roughly 2½ cents delivered to the fabricator, 3½ cents to weld, and 2 cents per pound for other charges. In the form of machinery and equipment which sells for 20 cents to one dollar per pound the welding is a larger proportion and the base cost of steel a smaller proportion of the selling price.

Evaporator Is Welded Maze

MISCELLANEOUS assortment of tubes fused together into one single piece of steel form an ammonia evaporator unit for an ice tank. Fabricated by Rierson Bros. Welding Works, Greensboro, N. C., this unit is 25 feet long and 4 feet, 7 inches high. It was built by joining together five different sizes of pipe by arc welding and has a total of 600 welded joints. Photo courtesy Lincoln Electric Co.

Gather Welding Knowledge

WELDING Research committee of the Engineering Foundation is carrying out a program of publishing in *The Welding Journal* information of incalculable value to users of welding. A conservative estimate of the cost of getting the information contained in the February issue would certainly be not less than 100 thousand dollars. It should be remembered that this committee does not do the same sort of service job that trade papers do for their subscribers in finding what has been printed on some subject in which the subscriber is interested. But month after month the committee collects and edits information in specialized fields which is obtained from members of the society who may have spent large amounts of corporate funds in experimental and production work. Nor is the committee concerned with the news value of its publications as is the case with commercial publications. Patient collection of information, details, observed facts and forever building up of a structure of knowledge of welding processes is the basis of the efforts.

The results of such labor are everywhere apparent in the speed with which welding becomes useful to the community at large. Each new individual interested in welding starts where others have left off; not where they began. Costly blunders may be avoided in many cases. The effort is co-operative. Each man gives that he may receive and all may prosper. No man interested in welding can afford to remain aloof from this great work.

Foundrymen Deal with Technical Problems of Castings Production

ADDITIONAL reports of technical sessions held during the forty-first annual convention of the American Foundrymen's association in Milwaukee, May 3-7, are presented on this and succeeding pages. A number of sessions were reported in STEEL *last week; others will be reviewed next week. Although many technical sessions, roundtable luncheons, and daily shop operation courses provided an extensive convention schedule,* STEEL *is reporting a considerable portion of the proceedings*

Steel Castings

WITH nondestructive testing of steel castings assuming increasing importance in the last few years, practically all of the second steel session was devoted to consideration of the methods used and the attitude of foundrymen toward them. R. A. Bull, steel castings consultant, Chicago, presided as chairman. He paid tribute to the late George Batty, consultant on steel castings, Drexel Hill., Pa., who at the time of his death recently was a member of the steel division executive committee and the committee on methods of producing steel for castings. Major Bull was authorized to prepare a suitable resolution to be sent to his widow.

Committee Makes Study

Nondestructive testing of steel castings involves radiographic examination either by X-rays or gamma rays and these two methods have been under study during the past year by a committee established a year ago under the chairmanship of C. W. Briggs, physical metallurgist, naval research laboratory, Anacostia, D. C. Mr. Briggs outlined the purposes of this committee and reviewed the progress made thus far. He called attention of foundrymen to the symposium on radiography conducted by the American Society for Testing Materials at its 1936 annual meeting, stating that published proceedings contain much important information in connection with castings inspection.

Mr. Briggs called upon E. J. Ash, associate metallurgist, Watertown arsenal, Watertown, Mass., a member of the A.F.A. radiography committee, to explain the X-ray and gamma ray methods. Mr. Ash first classified defects found in steel castings as: (1) Those due to shrinkage—metallurgical defects; and (2) those due to founding—these consisting principally of inclusions. He showed a number of radiographs made by the two methods, pointed out the two classes of defects and exhibited a few castings which had been cut away to show the defects.

R. E. Gezelius, naval research laboratory, Anacostia, D. C., followed Mr. Ash with a brief paper prepared to show the investment which a foundry would be required to make to equip itself for either X-ray or gamma ray inspection. Generally speaking, an X-ray installation capable of inspecting sections from 3½ to 4 inches thick would require an expenditure of about $12,000 and gamma ray apparatus of comparable capacity an expenditure of approximately $7000.

Discussing radiography as a tool in the foundry, L. D. Christy, American Manganese Steel Co., Chicago Heights, Ill., showed a number of lantern slides of defective castings and their X-ray radiographs, then the same castings after redesign and their radiographs free of defects.

Warns of Many Pitfalls

Dealing with radiography as an inspection tool, L. C. Wilson, general manager, Reading Steel Casting Co., Reading, Pa., and a member of the radiography committee, asserted there are many pitfalls in using the radiographic method for acceptance or rejection of castings. These are largely a matter of interpretation of the films. In his opinion, the service to which a casting is to be put must be considered in conjunction with the radiographs. Factual evidence is imperative.

At the conclusion of these surveys of the situation confronting the foundry industry, Major Bull called for comments which would help to determine the attitude which foundrymen should take toward radiographic testing. In expressing his opinion, E. W. Campion, president, Bonney-Floyd Co., Columbus, O., asserted that every manufacturer of castings should acquaint himself with nondestructive testing which is now in its infancy so far as foundrymen are concerned.

Needed at present, said Mr. Campion, are the production of good film pictures and some uniform interpretation of these pictures so that there shall be agreement upon what is acceptable for rejection, repair or acceptance of the castings. Foundrymen must be willing to accept someone as an authority on the subject. Furthermore, for the sake of uniformity in interpretation of radiographs, the examiner must have at his disposal the same type of casting history in all cases. In concluding, he stated that economics will play a part as to what extent radiographic inspection will be demanded by purchasers of castings. Foundries will be obliged to charge higher prices for castings if customers insist on this form of inspection.

Has Intelligent Uses

P. E. McKinney, metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa., pointed out that some foundries now are using radiography quietly for their own edification. In many cases, intelligent use of the method has prevented rejection of castings which otherwise would have been condemned, thus the tool can be a help as well as an imposition. To prove his case, he cited the example of a large turbine casting which developed a leak at some distance from a defect which had been repaired by welding. It was assumed, therefore, that the casting had a porous section; however, radiographic examination proved the section to be sound and the leak was a "whistle" which could be repaired satisfactorily and safely by welding.

Mr. Briggs emphasized that in all

cases the radiographer should study a casting at the same time he studies its radiograph. Unless this is done, interpretation cannot be accurate and the method cannot be applied in a way to make the most of its possibilities. In closing this portion of the session, Major Bull observed that foundrymen sometimes are accused as being obstructionists to scientific progress, but they may be forced to take this attitude because they are subjected to unfair specification requirements.

Reviews Heat Treatment

Report of the association's committee on heat treatment of steel castings was presented by David Zuege, metallurgist, Sivyer Steel Casting Co., Milwaukee. Reviewing developments for 1936, the committee recorded no important new developments, but referred briefly to the Tocco high-frequency induction process of selective hardening as having possibilities for certain types of steel castings, particularly crankshafts. Note was made of increasing use of differential heating and quenching to obtain varying degrees of hardness in the same casting. Greater use also is being made of differential heating by the oxyacetylene flame. Controlled atmosphere furnaces have not received favorable reception by steel founders, it was stated.

Some 50 members of the steel division attended the luncheon and roundtable discussion Wednesday noon. R. C. Woodward, Bucyrus-Erie Co., South Milwaukee, Wis., and A. H. Jameson, Malleable Iron Fittings Co., Branford, Conn., presided as chairman and vice chairman, respectively. The entire time was spent in presentation and discussion of a summary which C. W. Briggs, physical metallurgist, naval research laboratory, Anacostia, D. C., had prepared of the second report of the steel casting research committee of the British Iron and Steel institute. The report, designated No. 15, was published by the institute in 1936.

Certain portions of the report are of considerable interest to American foundrymen and much of the discussion centered around how the British research work agreed with work in this country and how the findings can be applied to the practical side of the steel castings business.

Use of portland cement as a binder for molding sand proved a most interesting subject at a steel session devoted to founding practice. A paper reporting research on utilization of cement was presented by Carl A. Menzel, associate engineer, research laboratory, Portland Cement association, Chicago.

Mr. Menzel stated that cement was known to have been used 40 years ago, but the practice did not become common. Recently, however, interest in its possibilities has been renewed, principally due to development of inexpensive high early strength cements and a new process originating in Europe and recently brought into the United States. The speaker described the nature of the tests made and reported these tests to show the feasibility of using cement. He made the following recommendations as a guide:

"For facing the mold only fresh, clean, well-graded silica foundry sand should be used. The sand should be mixed with about 10 per cent cement and a total of 4½ per cent water by weight of the dry materials. This damp mixture should be rammed in the usual manner and to proper thickness. It can be backed up with a mixture composed of cement and a lower grade of sand or other material.

Cements Are Compared

"Such a facing mixture, when made with high early strength portland cement and protected from loss of moisture for the first 24 hours, will have excellent strength and permeability for foundry purposes, two or three days after molding, even though dried rapidly following the initial 24-hour moist period. If normal portland cement is used, green strength will be lower and a longer curing period and greater age will be necessary to obtain the same set strength. Increasing the amount of normal portland cement would give adequate strength, but would bring about an undesirable decrease in permeability and increase the lime constituents at the surface of the mold.

"The facing mixture may be mixed and rammed in the usual manner but extended mulling should be avoided to reduce temperature rise and moisture loss. Mixtures at normal temperature of 70 to 80 degrees Fahr. should be rammed within 2½ hours after mixing if made with high early strength cement, and within 4 hours if made with normal portland cement. Mixtures at higher temperatures, say 100 to 110 degrees Fahr. should be rammed as soon as possible after mixing but not later than 1 hour."

First to make comment at the

Additional Foundry Show Highlights

TALLEST piece of equipment in the show was a large scale model of a cupola charger which stood approximately 20 feet high. Built by the Modern Equipment Co., Port Washington, Wis., it had a framework and track fabricated from welded structural sections. When a push button was operated, the charging bucket traveled up the curved inclined track to the charging position, the conical bottom opened to release the charge and the bucket returned automatically to loading position.

* * *

Before the exposition had scarcely opened, many pieces of equipment bore "sold" tags. In most cases, however, the equipment had been sold previously and was simply "borrowed" from purchasers so that it could be exhibited. Some manufacturers are so hard pressed to make deliveries that stocks are depleted. This situation is particularly true with manufacturers of materials handling equipment, such as industrial trucks and tractors. One builder of storage battery trucks was obliged to borrow from a customer a unit which had been in service for a month—this required a clean-up and fresh paint job. Two other makers of electric trucks had single units marked sold and a gasoline truck builder argued customers into a few days delay in deliveries so that three models might be displayed.

* * *

What was claimed to be the world's largest hacksaw was operated by the Armstrong-Blum Mfg. Co., Chicago. This saw had an 18 × 18*-inch capacity—it was in daily performance cutting sections from three* 6*-inch diameter rounds simultaneously. The saw blade was* 24 *inches long,* 2 *inches wide and* 0.072*-inch thick and weighed a fraction over* 1 *pound. A feature of the blade is that the* 18 *per cent tungsten high speed steel tooth edge is integrally welded to an extremely tough and nonbrittle chrome-vanadium steel back or body.*

* * *

"Largest Boot in the World" was the placard on a giant-size shoe exhibited in connection with a display of safety wearing apparel for foundry workers. This boot, made by the Safety First Shoe Co., Hollister, Mass., stood 7 feet 6 inches high and measured 5 feet 4 inches in length of sole. It was designated as size 168. Costs were itemized as follows: Last, $120.43; patterns, $26; forms, $125; and labor, $150. Required for its making were 90 feet of upper leather and 65 pounds of sole leather. The "old woman who lived in a shoe" would find the accommodations adequate.

PARTNERS THREE

Man, Metal, Machine—all must cooperate to maintain top quality in the production of screw parts.

To utilize the full efficiency of the skilled operator, give him good tools to work with, and good materials to work on—the latest type of automatic screw machine *plus* Ultra-Cut Steel—what a combination!

Ultra-Cut offers to the metal working industry a new opportunity to pare down costs by accelerating spindle speeds and rates of feed.

Average increases of 30% to 40% in output are obtained by substituting Ultra-Cut for standard grades of screw stock. We say average, because under favorable conditions, production is often doubled.

More parts per hour with equal or greater tool life—and no sacrifice of quality, for Ultra-Cut machine parts show consistently good character.

All Ultra-Cut asks is an even break—give it a tryout on your automatics. In scores of plants, trial runs have made many converts to Ultra-Cut Steel.

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conclusion of Mr. Menzel's paper was Marshall Post, vice president and works manager, Birdsboro Foundry & Machine Co., Birdsboro, Pa., who commented upon his company's experience with the Randupson process which makes use of molds made with a cement-sand mixture. Some time after the process was developed in France, the Birdsboro company investigated it thoroughly and subsequently took out a controlling license for its use in the United States.

Mr. Post asserted experience has borne out the expectation that castings produced by the process would be superior to those made in dry sand molds. At present, production in one of the company's plants is almost exclusively by the process. Drying ovens are not needed, consequently three of five units in the plant have been taken out of service.

C. E. Sims, supervising metallurgist, Battelle Memorial institute, Columbus, O., had suggested the investigation pursued by Mr. Menzel, therefore, he outlined the history of the work and commented upon the usefulness of the results.

More Facts Are Needed

At this point, discussion reverted to the Randupson process and R. E. Aptekar, assistant general superintendent of foundries, American Brake Shoe & Foundry Co., New York, said he had made some tests and found the process to be all that was claimed for it. He stated, however, that more needs to be known concerning the thermal reaction on molds containing cement, particularly as regards moisture.

The matter of floor space was mentioned by two people, for the Randupson process requires increased space for mold storage during the drying period. In one European plant this problem has been solved satisfactorily by providing the required storage space vertically to conserve floor space, it was stated. Someone else pointed out floor space is a rather inexpensive item to supply.

Major R. A. Bull, steel foundry consultant, Chicago, said he had observed the process in operation and was impressed by the fine surfaced castings made by it, but he warned that like every process it had limitations and care must be used not to apply it to work for which it is not suited.

Turning back to the subject discussed by Mr. Menzel, C. W. Briggs, physical metallurgist, naval research laboratory, Anacostia, D. C., inquiried as to why the investigation seemed to aim for high mold strengths. Mr. Menzel replied that his work was not intended to derive high strengths; he was simply reporting the values as they were obtained. He admitted that he didn't know what the strength values should be and he didn't know that anyone knew. In concluding, he stated the Portland Cement association was not interested in any specific cement mold process, but only in determining the legitimate uses for cement in molding sand mixtures.

Need Accurate Sand Control

Sand control in relation to steel foundry production was discussed in a paper by Charles Fuerst, Falk Corp., Milwaukee. Purpose of this paper was to show in a practical way the value and need of accurate sand control in producing the best possible castings with the materials and equipment available, at the same time keeping an eye on cleaning and material costs.

To obtain fullest results from sand control, the same care that is used in preparing the sand must be used in general molding and core making practice. A sand laboratory may be ever so well equipped and the person in charge ever so conscientious, he said, but if the co-operation which should exist between him and the various department foremen is not there, the whole program will probably amount to just a futile item of expense.

Discussion of this paper centered principally around the use and effect of water in oil sand core mixtures. Chief function of the water, it was agreed, was to cause swelling of the sand particles.

Sand control has not kept pace with progress in steel castings metallurgy, said Mr. Aptekar in submitting the report of the committee on foundry sands. In this report he outlined work of the committee and asserted that much time and effort to develop procedure and equipment for sand control.

Refractories

REFRACTORY materials and their application in foundries were considered at a session devoted exclusively to this subject. Three technical papers were presented and a committee report submitted. Two of the papers dealt with insulating refractories, one with their manufacture and physical properties, the other with their service properties and applications. In the former, G. A. Bole, research professor of ceramic engineering, Ohio State university, Columbus, O., quoted the A.S.T.M. definition of insulating firebrick as "a product with low heat conductivity suitable for use as a lining for furnaces."

Use of insulating firebrick has come about so rapidly that methods of manufacture and specifications for use have not been standardized, said Mr. Bole. Large savings reported in fuel consumption and in time of heating up a furnace have made the average furnace operator question whether a new unit should be built of this type refractory.

By way of caution, Mr. Bole pointed out these refractories cannot be used in contact with slags and therefore are unsuited for furnace bottoms; they have poor resistance to abrasion which would render them unsuited to certain users; they are pervious to air and this could be a drawback in certain construction; and they have relatively low resistance to spalling which might be a limiting factor.

Much valuable information of service properties of insulating refractories was contained in the paper by A. V. Leun, refractory engineer, Bethlehem Steel Co., Bethlehem, Pa. He described several furnace installations and gave comparative figures on operation and several brands of brick.

Conclusions were summarized in the paper as follows:

"Application of insulating refractory brick to furnaces such as forge, car-bottom, reheating and treatment will result in great fuel savings. Where slag attack or abrasion is a factor, use of fireclay brick is advised in those wall sections where these attacks occur. Insulating refractory brick are rapidly eroded and worn away by either slag attack or abrasion.

Coating Is Recommended

"It is recommended that all brick be layed and sprayed with a suitable high temperature cement. Care should be exercised to allow sufficient room for expansion in the walls.

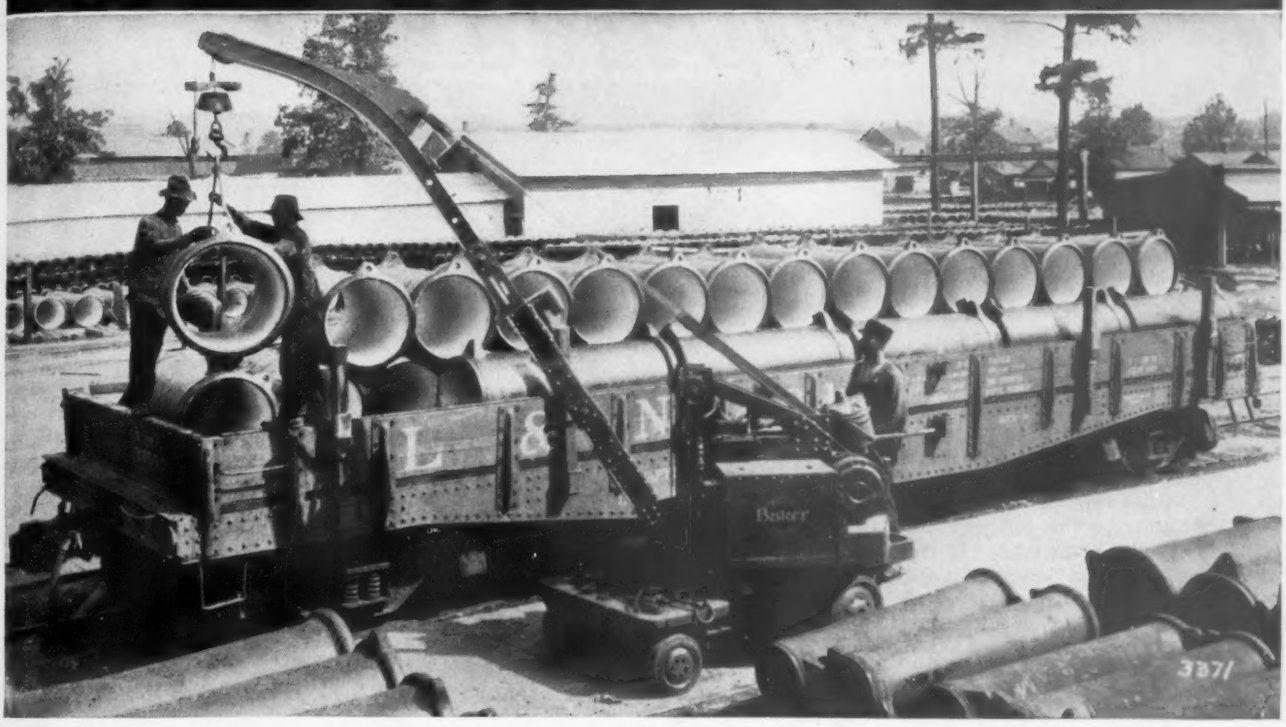
"Use of suspended insulating refractory brick roofs has become an accepted fact. Due to their texture, it is recommended that the suspension medium be in the brick. External suspension of the brick will cause early failure.

"Operation of a furnace built of this class of brick is different than with a fireclay construction. When raising the temperature of a furnace built of insulating brick, far less actual heat input is necessary than when using fireclay brick for the same temperature increase. When cooling down, fireclay brick, having a high heat content, will allow for a slower furnace temperature drop than will insulating refractory brick. Where a slow drop is desired, it is necessary to maintain fuel input higher with insulating brick than with fireclay brick."

Difference of opinion existed as to the desirability of using a refractory coating on insulating firebrick. Mr. Bole said tests indicated little ad-

(*Please turn to Page* 81)

Delicate Cores or HEAVY CASTINGS



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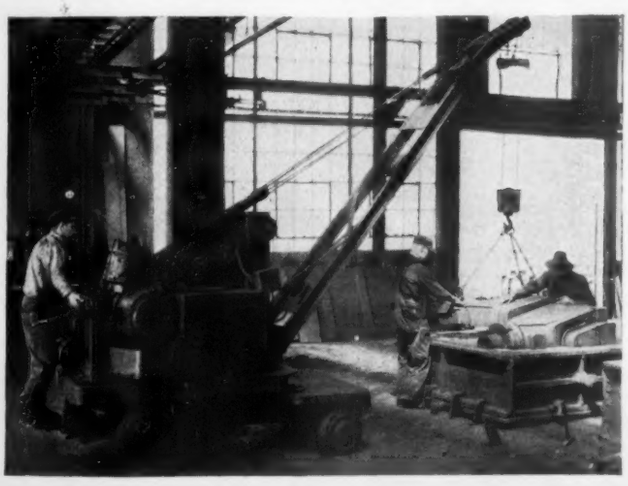

RUGGEDLY built to stand the gaff of jobs which require constant heavy-duty service . . . yet so accurately controllable that delicate cores can be set in place without breakage . . . BAKER Crane Trucks are the "Handy Andies" of foundry operation, popular with men and management wherever used. Indoors and out Baker Cranes travel speedily from job to job, always in demand and always saving time and money on both routine and emergency work.

Capacities, 3,000 to 10,000 lbs. at 5 to 8 ft. Telescoping or rigid booms furnished up to 20 ft. in length. Hoisting, slewing and topping motions independently controlled from operator's position.

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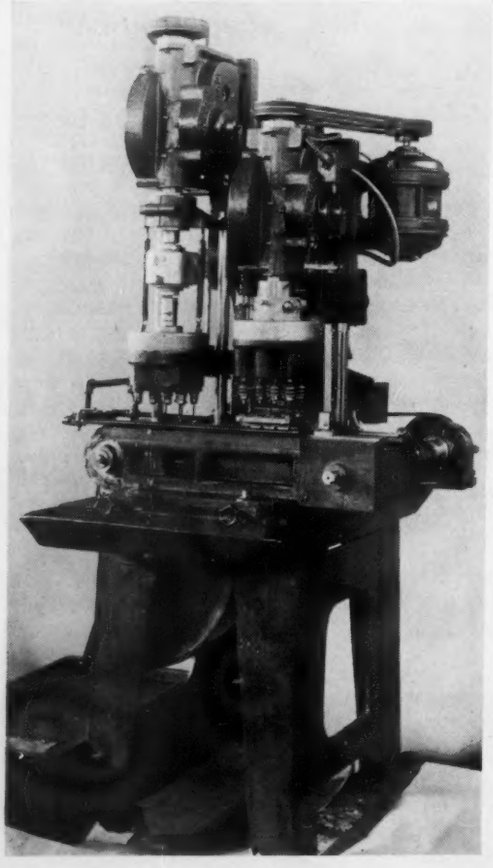
The most economical way to handle material is NOT to HANDle it

NEW EQUIPMENT

Drilling Machine—

Langelier Mfg. Co., Providence, R. I., has recently built a machine for drilling and tapping door knob spindles. It is constructed with two standard automatic drilling units mounted on a vertical column each driven by individual motors. The right unit is equipped with a 7-spindle attachable multiple drill head; the unit to the left equipped with a 7-spindle attachable multiple tapping head used in connection with a reversing mechanism. After the drill head is started in motion, it operates a trip dog on the tapping head which feeds the taps through the work. Fixtures on the machine are adjustable so that spindles having four, five, six or seven holes can be drilled and tapped. Control of the indexing is through a solenoid-operated single cycle clutch which is controlled from limit switches so that the indexing will not take place until the heads return to their starting position, thus preventing jamming and breaking of drills and taps. Work is loaded into a vertical magazine and fed progressively through the drilling and tapping stations. Lubricant is provided by a motor driven pump which directs a stream of cutting fluid to each of the tools. Drilling head is provided with spindles which are gear driven and mounted on ball bearings. Jacobs chucks are used to allow for grinding the drills. The tapping head has compensating spindles so if the drill breaks, the corresponding tapping spindles will recede into the head instead of breaking the tap.



Special drilling and tapping machine recently designed and built by Langelier Mfg. Co.

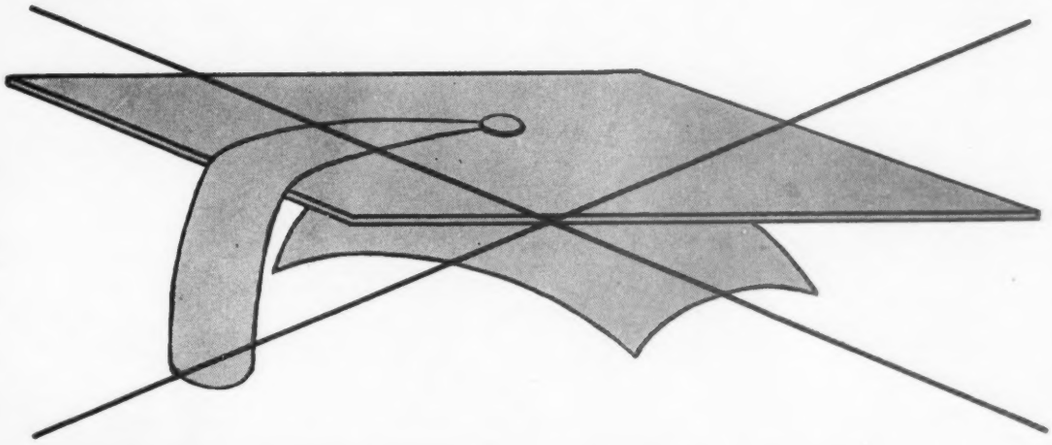
♦ ♦ ♦

Wrist Timer—

M. J. Stillman Co., 116 S. Michigan avenue, Chicago, is now introducing a new line of chronograph wrist timers. These instruments embody a 15-jewel time piece, recording time of day and in addition, the chronographic features of a sweep hand registering in seconds and fifths of seconds, or if desired, in decimals of a minute. The model illustrated herewith has computations on the dial which may be used for ascertaining production per hour, miles per hour or timing of any single operation expressed in terms of hourly capacity or speed. Two control buttons are provided, one to return the sweep hand to zero

Chronographic wrist timer now being distributed by M. J. Stillman Co.

4 YEARS AT COLLEGE-



THROWN AWAY!

Are you a technically trained college grad? Then you've had an education in welding and machine tool operations for making small parts. But it's 100 to 1 you didn't hear about the cold-forging of small parts—the process that often eliminates all these. The application of cold-forging to small parts is so new that it hasn't reached the text books. Yet this art is being developed in hundreds of forward-looking plants. Manville knows this art.

Don't be surprised if our cold-forging machines save you 20% to 70% in the production of small parts. A single cold-forging machine will often do away with two, three or four complicated manufacturing steps. The steps are simpler. Stock is cheaper. Speed is jumped. Cold-forging uses low-priced wire instead of bar stock. Our engineers will gladly make recommendations without obligation.

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and the other to regulate it for interrupted observation. The instruments are cased in stainless steel and movements are equipped with first quality hair springs and metal balances which are non-magnetic.

♦ ♦ ♦

Sketch Pad Set—

Wade Instrument Co., 1663 East 118th street, Cleveland, has recently placed on the market a sketch pad set intended for making any type of sketch to any scale. The set consists of a pad of tracing paper and a cellulose covered buff guide plate which slides under the top sheet of the pad and is printed in blue ink showing ⅛-inch squares, every ½-inch line heavy and every 1-inch line numbered. This guide is printed on the reverse in an isometric design with all axes divided 1-inch, ½-inch and ¼-inch. A steel straightedge is also provided. Pads are available in three sizes of 5½ by 8¼; 8½ by 11 and 11 by 17.

♦ ♦ ♦

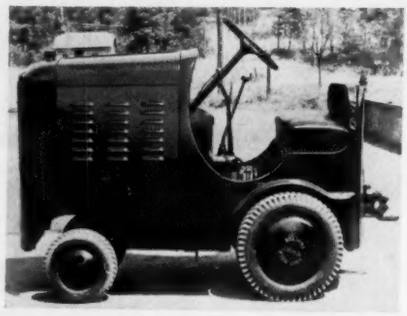
Double Crank Press—

E. W. Bliss Co., Toledo, Ohio, announces a new and improved design of the No. 4 high speed automatic blanking press. This press, although single geared, will operate from 30 to 90 strokes per minute through a variable speed drive. The range of speed is to permit selection of the best operating conditions to suit the length of feed and the gage of metal to be run. A convenient hand chain controls the speed adjustment of the variable speed drive. A magnetic line starter and a push button controls the 5 horsepower driving motor which in turn is connected to the flywheel by means of a V-belt. High speed rolling key clutch, locking pawl and releasing brake are standard features on this new press. Stroke is 1½ inches provided with an adjustment of 3 inches.

♦ ♦ ♦

Gas Tractor—

W. F. Hebard & Co., 433 S. Jefferson street, Chicago, has recently introduced a new small size gas tractor known as the Model M Shop Mule. The unit is powered with an International P-12 engine and clutch and is small enough to be turned around inside a freight car. This model has been produced to serve the needs of pulling or pushing



Midget gas tractor recently introduced by W. F. Hebard Co., which can turn around inside a freight car

heavy materials in congested areas and over smooth floors. The truck operates on ½-gallon of gas per hour of work done with nominal oil consumption, according to the company. Drive axles and brake parts are standard Ford units while International Harvester dealers can supply motor and clutch parts. Engine is of removable cylinder-sleeve construction type which eliminates need for reboring the cylinders. In addition to the three-wheel model illustrated herewith, there is also available a similar size model in four-wheel construction, and a larger wheel base model which provides room for stake or box body.

♦ ♦ ♦

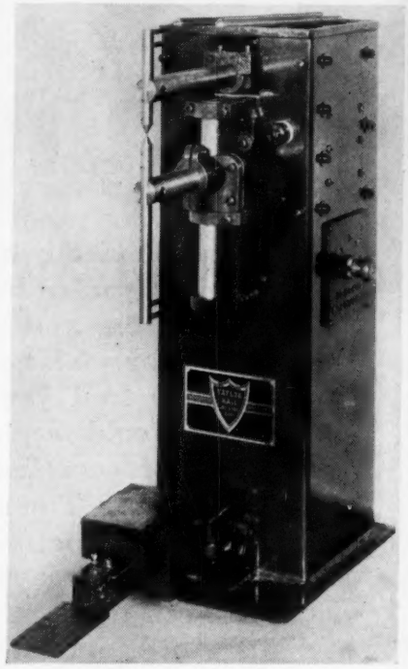
Fans—

Emerson Electric Mfg. Co., St. Louis, announces several additions to its line for 1937. Among these are a new two-speed 12-inch oscillator, a 10-inch oscillator with a new adjustable floor stand and 12-inch ventilator in mounting panel or wall box. In addition to these, there are available 8 and 10-inch models of the same type. These models are also available with overlapping blades if desired.

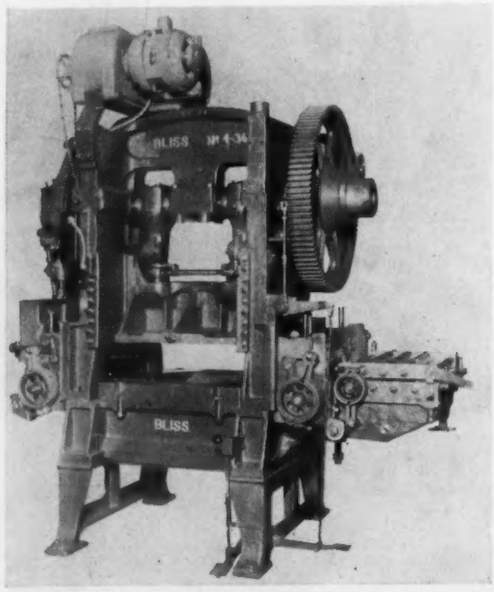
♦ ♦ ♦

Spot Welder —

Taylor-Hall Welding Corp., Worcester, Mass., has recently placed on the market a new spot welder embodying several new features. In this unit the upper electrode moves in a vertical plane and not on the arc of a circle. The transformer and upper horn assembly are used as the pressure unit so that adjustable counter weight for pressure changes on light and medium heavy work. Foot treadle leverage is 3½ to 1 in order to reduce pressure needed for operation. A newly designed rocking step plate is located on the end of the treadle and operates the switch. This eliminates a large amount of the foot movement, according to the company. A turnbuckle adjustment for the foot treadle height is provided.



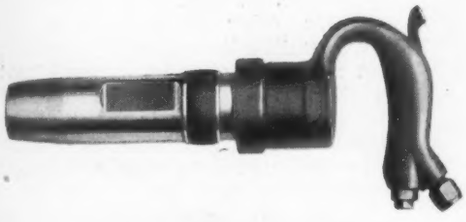
Upper electrode moves in a vertical plane in this new Taylor-Hall spot welder



Bliss No. 4 high speed automatic blanking press which will operate from 30 to 90 strokes per minute

CHIPPING HAMMERS

HIGH SPEED—POWER—EASY-HOLDING



Size 300 Chipping Hammer

This "flapper-valve" hammer is the size recommended for use on heavy steel castings and low carbon and alloy steel billets.

I-R Pneumatic Tools include Chippers, Grinders, Hoists, Rammers, Riveters, Drills and Reamers, Core Breakers, Scalers and Wire Brushes. A complete line of high quality accessories is also available.

I-R CHIPPING HAMMERS are famous for their ability to handle the difficult chipping work on alloy steel ingots, blooms and billets. The popularity of these hammers is demonstrated by their widespread use in the majority of the large steel mills where billet chipping is so important a step in production.

I-R CHIPPERS are made from specially-treated materials, and are equipped with the well-known "flapper valve" which is self-seating and practically indestructible. They are powerful, easy to hold, and have a very low maintenance cost.

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Porcelain Enamel Forum Stimulates Interest in Improved Shop Practice

(*Continued from Page* 60)

quired for production with a consequent lower overhead," stated Herman L. Cook, superintendent enameling plant, Norge Corp., Muskegon, Mich. "At the same time managements insist on no reduction of quality of finish from two cover coat work. So far this requirement has been difficult to fulfill. There is always present the fear of jeopardizing the reputation of the concern.

"Parts for one cover coat work should be expressly designed without sharp edges or short radii," the speaker asserted. "Flimsy parts or work designed primarily for beauty give trouble with one cover coat. Dryers must be perfected as production work cannot wait for air drying."

Mr. Cook expressed the belief that some unknown condition or quality of the steel is responsible for "poppers," a type of blister, which in his experience has presented the most baffling problem. He also thought that the production of one cover coat ware is a ground coat problem rather than a finishing problem.

"One cover coat work requires intense and unending supervision of labor, enamels and processes," continued Mr. Cook, "which reduces the estimated cost reductions. Also, automatic spray control and elimination of rehandling by use of conveyors help. If it is necessary to lift, handle and brush, there is less chance of success. One of the most distressing problems is color matching of parts for use in connection with two cover coat work. In applying the ground coat extreme care must be taken to remove all metal particles."

In the discussion considerable emphasis was placed on the possibility of impairing the reputation of porcelain enamel by using a one cover coat. Enamel ware must have sales appeal and reliability and attempts to meet the cost of synthetic competitive finishes may harm the industry, was a thought expressed. Therefore, until further perfected one cover coats should be limited in application.

Light Cover Coat Sought

Another experience reported was that "nickel dipping" improves quality and gives less rejects due to oxidation; electric pickling however, is preferable. Doubt was expressed whether color problems will be solved until a light-colored, although not necessarily white, ground coat is obtainable. Normally too great thickness of enamel is required, on one cover coat, which causes production difficulties to obtain a good white products.

When new designs are first considered is the time for the enameling shop to object to those which may cause trouble in production, was the thought expressed by Jay Simons, superintendent of enamelig plants, Westinghouse Electric & Mfg. Co., Mansfield, O. Necessary changes can be made at that time at minimum expense and inconvenience.

Mr. Simons also suggested the advantages of placing the metal fabricating and welding departments, which feed work into the enameling department, under the supervision of the enameling department head. This would provide unified control over fabrication as well as finish of the work. Enamel is reclaimed from spray booths by a new type of electrical precipitator developed by the company. This precipitator, it was

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PERKINS MAN COOLERS are easily moved by overhead crane, making them quickly available anywhere. By providing refreshing re-circulation of air at the same temperature the men are working in, they maintain production in the hottest places. This means contented workers, fewer errors, fewer accidents.

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stated, provides a cleaner enamel for reuse.

Walls of spray booths, Mr. Simons stated, are of flat white, and 100 foot-candles of illumination is provided. Booths and everything else connected with enameling must be kept clean. Automatic pickling is especially desirable for large parts. A 4-inch overflow is maintained on rinsing tanks. A completely conveyorized installation reduced direct labor costs between 50 and 75 per cent and in addition effected savings through reduction of work-in-process and by permitting better rate setting.

At a group session on enameling cast iron emphasis was placed on the necessity of the proper foundry methods to obtain smooth castings and a type of iron suitable for enameling. Castings from general foundries, it was stated, are produced for high strength or other characteristics which are not so necessary for enameling.

Careful cupola practice to prevent melting at temperatures too high or too low was offered as one solution Operators were cautioned against attempting to operate cupolas for castings to be enameled at over 80 per cent of capacity. Iron of high fluidity is desirable and the percentage of combined carbon is an important consideration.

To Prevent Warping

Design of cast parts to permit equal expansion was considered important to prevent stresses being set up when the castings cool following enameling. Sand blasting at too high pressure produces a hard surface difficult to enamel and may increase the tendency to warp.

In a session devoted to special problems encountered in enameling sheet iron, E. R. Brauner, superintendent, Federal Electric Co., Chicago, spoke on the screen process and decoration. This process has been used extensively for years for painted and baked enamel signs but only in the last 10 years has it been applied to porcelain enamel ware.

Instead of the silk screen formerly used, wire-mesh screens now are utilized. Photographic application of design by the use of sensitized gelatine is considered to be the better process for preparing the screen but it is more costly. Grinding of enamel is an important part of the process because of the newer solvents used as vehicles.

The screen process has no place in the production of small quantities of porcelain enameled parts. It is essentially a quantity production method and capable of runs up to 5000 parts. Low cost in connection with volume and thin application of enamel are the outstanding advantages.

In discussing requirements of porcelain enamel for architectural work, Milton Gallup, sales department, Enamel Products Co., Cleveland, stated that no new manufacturing problems are encountered essentially different from those in the production of enameled stoves, refrigerators and washing machines. The main difference is that architectural work is produced in small quantities, making special tooling impossible.

Among suggestions Mr. Gallup offered were: Panel sizes should be held under 24 x 36 inches whenever possible; costly design due to cumbersome parts must be eliminated; fragile and curved parts must be carefully fabricated; pieces must be in perfect condition for enameling; other structural materials should not be imitated; use heavy-gage iron; improper crating and shipping may spoil completed work.

F. L. Micheal, enamel laboratory, General Electric Co., Erie, Pa., in a paper, "Porcelain Enamel Unit Construction as It Pertains to Refrigerators," emphasized the importance of nonsagging and nonwarping iron in the production of both shell and unit type refrigerator cabinets. He also commented on the advantages which would result from developments permitting a reduction in firing temperatures.

THE UDYLITE *Semi-Automatic* PLATING MACHINE

and what it will do for YOU

THE Udylite Semi-Automatic Plating Machine is a unit designed to produce better plated work at lower cost through close production control, elimination of rejects and labor saving.

The machine is a sturdy, durable unit built to operate continuously with a minimum of maintenance expense. In the construction are combined great strength and smooth, efficient operation.

A wide variety of sizes are available to handle any plating requirement. The Udylite engineer will be glad to investigate your plating problem and recommend the size best suited to your needs. Write to the nearest Udylite office for full details.

1 **Produces Uniform Deposits.** Just like "peas in a pod," every piece is uniformly plated as it is subjected to identical plating conditions. Plating time . . . current density . . . these and other important plating factors are the same for each part.

2 **Provides Close Production Control.** YOU set the chain speed by manipulation of the chain regulator wheel. At ¾ or 5 feet per minute or any speed between, the chain conveyor delivers work to the unloading station. Production is continuous and uninterrupted.

3 **Saves Labor.** With the Udylite Semi-Automatic, two men can do the work of five or six with the ordinary still tanks.

4 **Chain Does the Walking.** The operator of the Semi-Automatic works in one spot loading and unloading the machine. Instead of walking to and fro, he simply loads the conveyor and the chain actually does the walking. The time saved in lost motion between still tanks alone is sufficient reason why semi-automatic machinery should be given full consideration.

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Magnetic Testing of Cold Drawn Steel

(*Concluded from Page 57*)

form and free from fluctuations due to heavy load demands in other parts of the mill. This handicap has been overcome in some setups by an individual synchronous motor — generator unit.

2—Feed and discharge racks, as shown in Fig. 4, used for handling the bar stock are designed so that a bar passing through the induction coil moves at a steady speed and does not change position with reference to the center line of the coil.

3—As mentioned before, the stock to be tested must be commercially straight and of uniform temperature throughout. If these requirements are not adhered to, changes are produced in the current induction which are similar to those caused by defects.

4—Co-operation is essential between the operator, and the metallurgical laboratory so that checks can be made on brinell hardness, analysis and etch tests for seams, cracks and laps which cannot be seen by filing. Speed in production cannot take precedence over careful and conscientious inspection.

5—Perhaps the greatest factor contributing to successful testing is the operator himself. He must know a little about electricity, a little about metallurgy and a good deal about regular mill inspection. An interest in the work and a desire to learn are factors contributing to good testing. Much depends upon the care and skill of the operator and his knowledge of the characteristics of the machine.

As to the future possibilities of this method of testing, no one can say just what improvements will, or can be made. Of course, there are certain difficulties such as indications of periodic strain, and inability to isolate pipe which present themselves. There are hopes that these will be overcome in the near future as research is being carried on intensively at the present time.

As yet, this testing has been adapted only to cold drawn steel but, from all appearances, the hot mills soon will be using this same method of inspection for hot rolled stock and, perhaps, welded tubing. Shapes present no difficulties so long as the area of the cross section remains uniform and can be included when specifications justify internal inspection.

While magnetic testing is successfully serving the purposes outlined above, further research and experience will doubtless do much towards a better understanding of the relation between magnetic fields and steel bar structures which is really the basic principle of magnetic testing and will considerably extend its usefulness.

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111 YEARS' IRON AND STEEL MAKING EXPERIENCE

Air Cleaning Brought Close to Perfection

Air conditioning approaching perfection is being provided for part of the new 45-story Field building in Chicago. Electrostatic air cleaners manufactured by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., are being installed and will be in full operation by July. Temperature and humidity control already is in use. The arcade and firse four floors will be served by 18 electrostatic air cleaners with combined capacity of 272,700 cubic feet per minute. The electrostatic principle is designed to remove 99 per cent of dirt particles on current consumption of 10 kilowatts.

A feature of this service is relief to hay fever and asthma sufferers as well as reduction of cleaning costs to a minimum.

Foundrymen Study Refractories

(*Continued from Page 72*)

vantage is gained by the coating; Mr. Leun recommended use of the coating. One refractories maker advocated the practice for the reason that it reduces penetration of gases. Elaborating upon his views, Mr. Leun said his company uses the coating for three reasons: (1) To reduce penetration; (2) to protect surface of the brick from abrasion of iron particles swirling about in furnace atmosphere; (3) to give a glaze which is a poor receiver of radiated heat.

J. L. Allison Jr., Babcock & Wilcox Co., New York, complimented Mr. Bole for advocating that service tests on insulating firebrick be standardized. To obtain comparable heat conductivities of various brands of brick, the brick must be tested by the same method.

Use of firestone as a refractory was discussed in a paper by Harry Rayner, foundry metallurgist, Chrysler Corp., Detroit. This naturally formed material has a granular structure and chemical analysis coupled with a colloidal silica bond which gives it great resistance to fire and abrasion. The rock is split easily and cut to desired shape.

The speaker's paper dealt principally with use of the material for lining cupolas and stated that because of its economy its popularity is growing rapidly. Cupola runs are increased by the material. Among other uses of firestone which have been found practical, Mr. Rayner listed lining of bull or crane ladles, pig iron mixers, bessemer converters and soaking pits.

Malleable Iron

THREE papers dealing with important phases of malleable foundry practice occupied the attention of malleable foundrymen at one session. One paper, by W. R. Bean, vice president, Whiting Corp., Harvey, Ill., outlined developments in melting practice; the second, prepared by A. F. Landa, engineer, Central Scientific Research Institute of Machine Building, Moscow, U. S. S. R., and abstracted by Carl F. Joseph, metallurgist, Saginaw Malleable Iron Co., Saginaw, Mich., discussed the selection of cycle and furnace for annealing; and the third paper, by E. C. Zirzow, National Malleable & Steel Castings Co., Cleveland, dealt with sand control.

Mr. Bean confined his remarks on developments in melting to the period between 1912 and the present. He referred to the fact that the late B. J. Walker, Erie Malleable, Erie, Pa., was the first to employ the natural draft furnace extensively. This furnace in use in 1900 had a capacity of 30 to 40 tons, the largest type in use up to about 1925. At present furnaces are in use which produce heats up to 75 and 80 tons. In direct contrast, he also referred to what is probably the smallest air furnace in the United States. This furnace, located in New England, had a capacity of 5 tons until recently when it was converted into a pulverized fuel type unit and the capacity raised to 8 tons.

Two outstanding developments had their inception between 1912 and 1914 but a number of years passed before they were employed extensively. One is the duplexing method and the other is the use of powdered coal as a fuel. Later in the discussion period, Mr. Bean stated that at present only approximately 15 per cent of the furnaces in this country are hand fired; the remainder use either oil or pulverized coal.

In the duplexing process he advocated melting the iron as cold as possible, say about 2500 degrees Fahr., to minimize the carbon and sulphur pickup. In one installation melting approximately 200 tons per day, it is claimed that coke con-

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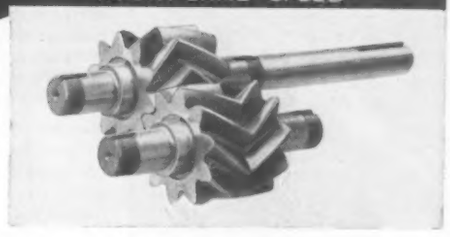

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sumed in the cupola amounts to 183 pounds per ton of iron melted.

Answering a question regarding relative cost of electric and coal firing in the second furnace in a duplexing unit, Mr. Bean stated that several factors must be taken into consideration, but that generally speaking the electric furnace is the more expensive. In the duplexing process the temperature is raised thereby promoting better graphitization. Replying to a question on the amount of carbon pickup in the cupola, he asserted that is a negligible factor, since the carbon content is decided by the manipulation of the metal in the second furnace in the duplexing unit. One and probably the chief reason for passing of the camel-back furnace in favor of the straight roof, is that the straight roof is easier to work. At present he estimated that not more than 5 per cent of the furnaces in this country are of the camel-back type.

No Accelerated Annealing

Mr. Landa, in his paper on selection of cycle and furnace, claimed that after extensive investigation he concluded that there is no accelerated annealing of malleable, but rather an optimum annealing cycle, dependent upon the iron to be annealed and the furnace equipment available. Cycles can be reduced by lowering the nonproductive time during which annealing is not taking place.

Mr. Zirzow, in his paper on sand, presented a detailed description of sand control as practiced in the plant with which he is connected. Factors of molding sand control were listed after which an outline of the mechanical method of handling the molding and core sand was described.

Furnaces Are Compared

The roundtable luncheon of the malleable division provided an opportunity to discuss numerous operating topics in an informal way. Developments in annealing furnaces were described, these including the recently installed continuous and batch type, radiant tube furnaces. With the continuous type, annealing is accomplished in 35 or 36 hours while in the batch type, the cycle occupies 48 to 50 hours. It was stated that the continuous furnace requires approximately 2700 cubic feet of gas while the batch type requires about 3300 cubic feet per ton.

Mention was made of an investigation of porosity as indicated on a series of x-shape bars poured under controlled conditions in several foundries. The bars had arms ½-inch square and ¼ x ½-inch section to simulate unequal sections adjoining each other. Some had only one size of section. Results obtained from measurement of the porous area in the center indicate that the relation between porosity and temperature is almost too small to measure, and the same was true concerning the relation between carbon content and porosity.

Replies to a question on melting two heats a day in one furnace indicate that some difficulty is encountered in meeting an 8-hour schedule unless the heats are 18 tons or under. Usually 9 to 9½ hours are required. However, if sufficient molds are made in the afternoon and allowed to stand over night, the first heat could be poured early, and an 8-hour schedule maintained. One speaker stated that with 18-ton heats, his company allowed a 2-hour lunch period which resulted satisfactorily. Discussion of fields of use for pearlitic malleable iron indicated that this material can be cast closely to size so that machining is minimized or eliminated.

Tinning of Steel Strip By Electrodeposition

(*Concluded from Page* 64)

tin deposit, bright acid tin deposit and rough matte acid deposit are unsuitable for steel which will be subjected to deformation.

This leaves as an alternate to hot-dipped tin coatings, the smooth acid matte coating and the composite coating produced by plating tin on a hot-dipped coating in an alkaline bath. From the technical viewpoint one of the chief problems in the production of the former type of coating will be the maintenance of conditions that insure the formation of smooth matte ductile deposits of tin. These will involve careful control since the structure of the coating is largely dependent upon the presence of suitable amounts of organic agents in the acid bath. The problem of polishing has already been discussed.

The cost problems in producing a composite coating of the type described are evident.

Taking into consideration the physical characteristics of all types of tin coating mentioned here, it remains to be seen whether the process involved in the production of satisfactory ductile coatings by electrodeposition will prove as economic as the hot-dip process. It should be borne in mind that the hot-dip process is likely to be improved and may be made continuous for the coating of wide strip. The narrow strip production in Germany has already pointed the way.

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MATERIALS HANDLING

Economical Methods of Handling Sheet Steel

(*Concluded from Page* 50)

Special sizes of sheet and strip stock are handled and stored in a similar manner.

When storing in space not serviced by the crane, skid loads of wide sheets are piled on each other two or three tiers high by the tiering truck. This permits piling anywhere on the floor with a corresponding saving in floor space.

Steel scrap is compressed into bales of about 125 pounds and loaded on skids which are stored to one side until a carload accumulates. In loading scrap in gondolas, these loaded skids are trucked to the shipping platform and set on a special platform alongside the gondola by a tiering truck. The skid load is tipped by the electric hoist used to unload steel and the bales slide off into the car.

In this way a car of scrap is loaded quickly and easily by one man. If loaded by hand, probably two men would be required to lift the bales over the side of the gondola.

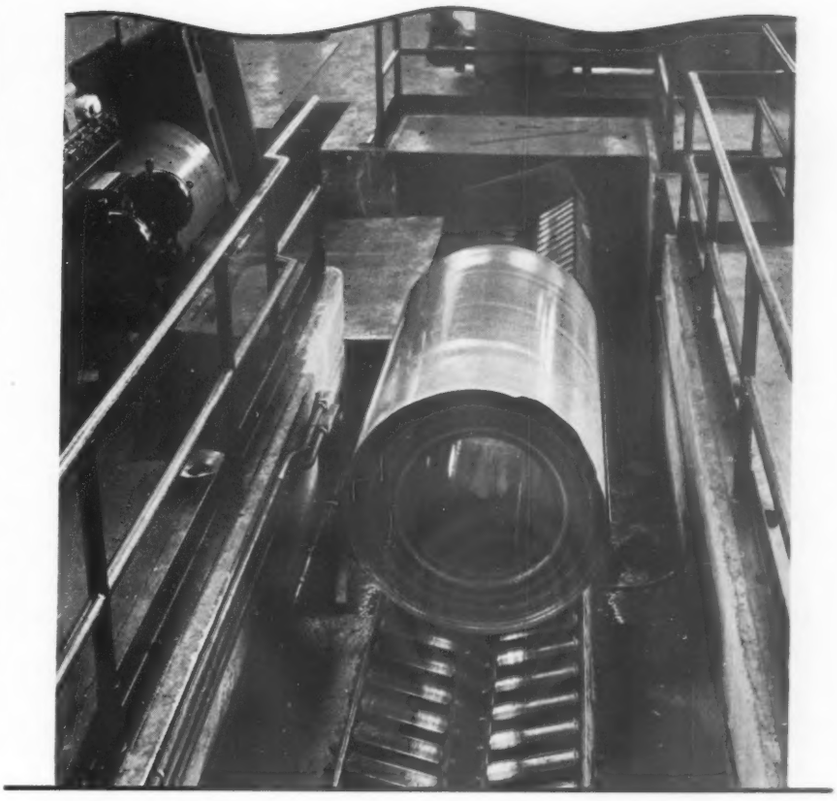
Coils of strip steel are handled on skid platforms. The increased demand for larger and heavier coils has made necessary a shift in storage space so that cranes may be used for handling. Previous to this, coils too large for handling had been moved and piled by a ram extension bolted on the end of the tier lift platform truck. This loading results in a severe strain on the truck and is an emergency solution rather than a recommended method of handling.

Facilities for Speeding Shipments

Handling routine is planned to tie in with shipments. Practically all material goes out by truck. The power-loading dock extends back into one of the bays served by a 5-ton crane. The truck is level with the floor so that trucks may be loaded by either tiering or low-lift power trucks as well as crane.

In each case the steel shipment is set up to facilitate unloading by the customer so as not to tie up the truck when delivering stock. Practically all concerns using steel in any quantities can unload by crane, hoist or lift trucks and the shipment is prepared accordingly.

The entire handling routine is planned to handle steel in as large units as possible and eliminate rehandlings, especially by the sheet.



INTERNAL TRANSPORTATION

IN the early days of iron and steel, furnaces and mills had to be located in strategic relation to coal, ore and limestone. External transportation dominated.

Today mills are located with reference to markets—and the dominating factor in steel production is *Internal Transportation.*

A few thousand feet of conveyer equipment inside the mill are a more important factor in production, output, costs than hundreds of miles of external travel.

Only the most advanced materials handling equipment embodying the modern principles of Continuous Flow and integrated production is good enough for today's needs. The Steel Industry has adopted Mathews conveyers and systems developed during the last decade of close co-operation with the industry.

Processing Equipment installed during 1936-37, embracing the ultimate in design and engineering in the Steel Industry, is illustrated and described in our catalog on Steel Plant Conveyers. Available now.

The leaders in this industry, responsible for 85% of steel production in the United States and Canada, are applying the Continuous Flow Principle of Handling Materials.

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RECENT PUBLICATIONS OF MANUFACTURERS

Copies of any of the literature listed below may be obtained by writing directly to the companies involved, or by addressing STEEL, in care of Readers' Service Department, 1213 West Third Street, Cleveland

Belt Vulcanizer—James C. Heintz & Co., 3738 West 143rd street, Cleveland. Folder 1136, illustrating its type "JS," new sectional mold. Folder 237, describing its 120 tire treader.

Oil Boiler—Hart & Crouse Co. Inc., 301 Turner street, Utica, N. Y. Circular describing its new No. 19 Royal oil boiler, completely automatic, for small house heating.

Brunorized Rails — Carnegie-Illinois Steel Corp., 434 Fifth avenue, Pittsburgh. Booklet giving complete information on a new method of producing an improved steel rail.

Universal Milling Attachment—Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati. Bulletin No. M-748, describing high-speed universal milling attachment for small or medium size cutters.

Dust Arrester—Claude B. Schneible Co., 3951 Lawrence avenue, Chicago. Booklet containing data on the dust removal efficiency of wet method dust collectors, with illustrations of testing equipment used.

Flame Hardening—Air Reduction Sales Co., 60 East Forty-second street, New York. Folder No. ADG-1051, giving general considerations involved in flame hardening applications, with numerous illustrations.

Price List—Electric Controller & Mfg. Co., 2700 East Seventy-ninth street, Cleveland, has issued four new bulletins, nine new price sheets, and a new bulletin index and checking list for its bulletin binder.

Refractories — Botfield Refractories Co., Swanson and Clymer streets, Philadelphia. Folders on three important insulating materials: fire brick cement, plastic insulating cement and plastic chrome cement.

Eliminating Excess Weight in Tractors—Cleveland Tractor Co., Cleveland. Folder No. 811, illustrating and describing progress the company has made in eliminating excess weight and increasing strength in its tractors.

Conveyors for the Foundry—Logan Co., Louisville, Ky. Bulletin No. 15, covering modern developments in gravity and power conveyors for handling flasks through molding, pouring, cooling and storage.

Compressors—Worthington Pump & Machinery Corp., Harrison, N. J. Bulletin L-612-B3, describing its improved opposed steam-driven compressors; featuring dual cross-head design, tie-rods that maintain all piston strains in line with the connecting rod, a uniform fly-wheel and counter-weighted running gears.

Plain Bearing Motors — Fafnir Bearing Co., New Britain, Conn. Circular No. 281, describing how plain bearing motors which are inefficient in operation or whose bearings have failed, are easily converted to the ball bearing type with its wide inner ring ball bearing motor cartridge.

Engine Driven Welders—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Folder No. 26-150, describing its engine driven welders, single operator, 200-300-400 amperes sets, including performance curves of the welder, fuel consumption curves of the engines and general descriptions of the welders and power units.

Screen Cloth Manufacture Requires Careful Control

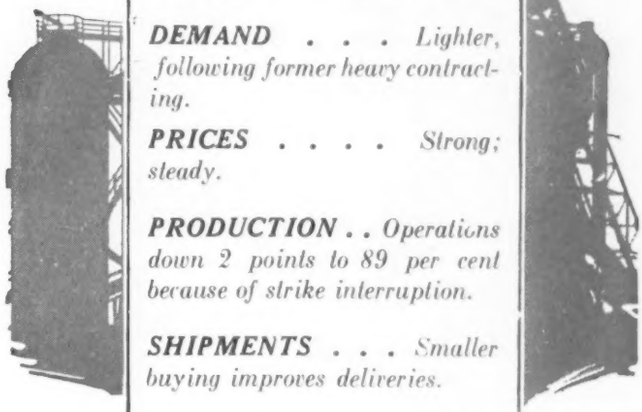
SUBSTANTIALLY 30,000 tons of wire are consumed annually in the manufacture of wire screen cloth, according to Frank W. Jones, president, Hanover Wire Cloth Co., Hanover, Pa. In addition, large quantities of slab zinc, lacquers and enamels are used in finishing such wire. These materials must be selected carefully. A little too much phosphorus in the iron ore or a little too much sulphur in the coke in the blast furnace, for instance, is taken up by the pig iron with a resultant lowering of the quality of the wire.

To portray the factors involved in producing wire screen cloth, this company arranged an educational exhibit which recently was displayed at a hardware show in Pittsburgh and subsequently in the show windows of the Joseph Horne Co., large Pittsburgh department store. This included samples of the materials by progressive stages. These demonstrated the steel cycle, starting with iron ore, limestone and coke and proceding through the ingot, the billet, the wire rod and to weaving wire. The copper cycle started with copper ore and included the ingot, the billet, the wire rod and the wire. The exhibit included looms actually engaged in weaving wire into screen cloth. Shown also were aluminum wire as well as slab zinc and other materials used in coating and finishing wire screen cloth.

MATERIALS of a wide range are used in the manufacture of wire screen cloth. They must be selected with care in order to control the quality of the product

Heavy Consumption Promises Early Buying

Scrap Decline Slows; Orders at Fair Rate; Autos at New High



MARKET IN TABLOID

DEMAND . . . *Lighter, following former heavy contracting.*

PRICES . . . . *Strong; steady.*

PRODUCTION . . *Operations down 2 points to 89 per cent because of strike interruption.*

SHIPMENTS . . . *Smaller buying improves deliveries.*

STEEL producers find themselves in a much easier position as a result of lessened pressure for deliveries and are able to make progress in reducing backlogs.

Buying is in satisfactory volume and while in smaller volume than shipments the industry as a whole has sufficient business to maintain production at the present high rate through July, it is believed. As a result of the better conditions it is possible to obtain fairly prompt delivery on some products as space on rolling schedules develops.

Apparently consumption of steel has suffered no diminution and the recession of buying is partially due to consumers reducing stocks accumulated when higher prices for third quarter were feared. With consumption undiminished and stocks worked down renewed buying must follow by midyear.

An indication of the rate of decline in current buying is found in the experience of one important producer whose bookings in the past three weeks have declined about 33 per cent from a former rate well above capacity.

Threat of labor trouble interrupting production of independent steelmakers last week caused consumers supplied by these companies to exert considerable pressure for immediate delivery of as much steel as possible. This caused conditions resembling those obtaining previous to announcement of third quarter prices, though in less degree. The threat came so suddenly that steel users had not been able to accumulate stocks in advance. Users of semifinished steel who had signed with the unions felt some perturbation over possibility of their raw material being interrupted.

Because of the strike at Jones & Laughlin Steel Corp. plants the Pittsburgh operating rate fell off 10 points to 83 per cent, last week, carrying the national rate down two points to 89 per cent. Chicago gained one point to 84 per cent. There were no changes in rate at Youngstown, 83; Eastern Pennsylvania, 73½; Wheeling, 94; Cleveland, 79½; Birmingham, 83; Detroit, 100; Cincinnati, 94; St. Louis, 94. Buffalo lost two points to 90 and New England three points to 87.

Automobile production continues at close to the capacity of the industry, last week's output being 141,892 units, topping the previous week's alltime high by 367 cars. General Motors ran 55,510 off the assembly line, Ford 35,900 and Chrysler 31,250. These represented a slight loss from the previous week, which was made up by increases by the smaller producers.

Paralleling other current statistical figures finished steel shipments of the United States Steel Corp. in April were the largest for that month since 1929. At 1,343,644 tons they were 70,755 tons less than the longer month of March. Four months shipments were 59 per cent larger than during the same period of 1936.

Railroads continue to place moderate orders for cars, rails and locomotives, sufficient to maintain backlogs of builders, who are experiencing an unusually active season. Union Pacific has placed 3800 cars. Rail mills are being pressed for deliveries as the season for laying track draws on.

Construction, which lags behind other activities, furnished some large tonnages the past week with 4100 tons of shapes for an international bridge at Thousand Islands, New York, 6000 tons of reinforcing bars for a store and warehouse at Chicago, 1500 tons of bars for a reservoir at Sioux City, Iowa, and 1450 tons for bureau of reclamation work.

Steelmaking scrap declined only slightly in the past week, prices being nominal in absence of buying in most centers. Indications are that the sharp decline is close to its end and that better prices may be expected as soon as consumers find need for replenishing stocks. The composite price at the end of last week was $18.60, a drop of only 19 cents from the previous week. This carried the composite back to the level of the last part of January. The composite of iron and steel prices declined nine cents to $40.05. Finished steel composite remained steady at $61.70.

COMPOSITE MARKET AVERAGES

	May 15	May 8	May 1	One Month Ago Apr., 1937	Three Months Ago Feb., 1937	One Year Ago May, 1936	Five Years Ago May, 1932
Iron and Steel	$40.05	$40.14	$40.25	$40.39	$36.74	$32.92	$29.34
Finished Steel	61.70	61.70	61.70	61.45	55.92	52.20	47.62
Steelworks Scrap ..	18.60	18.79	19.60	21.27	19.19	13.40	7.03

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	May 15, 1937	April 1937	Feb. 1937	May 1936
Steel bars, Pittsburgh	2.45c	2.45c	2.20c	1.85c
Steel bars, Chicago	2.50	2.50	2.25	1.90
Steel bars, Philadelphia	2.74	2.74	2.49	2.16
Iron bars, Terre Haute, Ind.	2.35	2.35	2.10	1.75
Shapes, Pittsburgh	2.25	2.25	2.05	1.80
Shapes, Philadelphia	2.45½	2.45½	2.25½	2.01½
Shapes, Chicago	2.30	2.30	2.10	1.85
Tank plates, Pittsburgh	2.25	2.25	2.05	1.80
Tank plates, Philadelphia	2.43½	2.43½	2.23½	1.99
Tank plates, Chicago	2.30	2.30	2.10	1.85
Sheets, No. 10, hot rolled, Pitts.	2.40	2.40	2.15	1.85
Sheets, No. 24, hot ann., Pitts.	3.15	3.15	2.80	2.40
Sheets, No. 24, galv., Pitts.	3.80	3.80	3.40	3.10
Sheets, No. 10, hot rolled, Gary	2.50	2.50	2.25	1.95
Sheets, No. 24, hot anneal., Gary	3.25	3.25	2.90	2.50
Sheets, No. 24, galvan., Gary	3.90	3.90	3.50	3.20
Plain wire, Pittsburgh	2.90	2.90	2.60	2.40
Tin plate, per base box, Pitts.	$5.35	5.25	4.85	5.25
Wire nails, Pittsburgh	2.75	2.75	2.25	2.10
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$37.00	$37.00	$34.00	$28.00
Sheet bars, open-hearth, Pitts.	37.00	37.00	34.00	28.00
Billets, open-hearth, Pittsburgh	37.00	37.00	34.00	28.00
Wire rods, No. 5 to ⅜-inch, Pitts.	47.00	47.00	43.00	40.00

Pig Iron	May 15, 1937	April 1937	Feb. 1937	May 1936
Bessemer, del. Pittsburgh	$25.26	$25.26	$22.30	$20.81
Basic, Valley	23.50	23.50	20.50	19.00
Basic, eastern del. East Pa.	25.26	25.26	22.51	20.81
No. 2 fdy., del. Pittsburgh	25.21	25.21	22.21	20.31
No. 2 fdy., Chicago	24.00	24.00	21.00	19.50
Southern No. 2, Birmingham	20.38	20.38	17.63	15.50
Southern No. 2, del. Cincinnati	23.69	23.69	20.94	20.20
No. 2X eastern, del. Phila.	26.135	26.135	23.385	21.68
Malleable, Valley	24.00	24.00	21.00	19.50
Malleable, Chicago	24.00	24.00	21.00	19.50
Lake Sup., charcoal, del. Chicago	30.04	30.04	26.54	25.25
Gray forge, del. Pittsburgh	24.17	24.17	21.17	19.67
Ferromanganese, del. Pittsburgh	107.29	99.79	84.79	80.13
Scrap				
Heavy melting steel, Pittsburgh	$19.75	$22.75	$19.65	$14.75
Heavy melt. steel, No. 2, East Pa.	16.75	19.06	17.75	10.81
Heavy melting steel, Chicago	17.50	20.75	19.50	13.05
Rail for rolling, Chicago	21.75	23.35	20.75	14.65
Railroad steel specialties, Chicago	21.25	23.75	21.00	14.65
Coke				
Connellsville, furnace, ovens	$4.85	$4.50	$4.00	$3.50
Connellsville, foundry, ovens	5.30	5.05	4.25	4.25
Chicago, by-product foundry, del.	11.00	11.00	10.25	9.75

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Prices Subject to Quantity Extras and Deductions (Except Galvanized)

Hot Rolled No. 10, 24-48 in.

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, del.	2.60c
New York, del.	2.73c
Philadelphia, del.	2.69c
Birmingham	2.55c
St. Louis, del.	2.63c
Granite City, Ill.	2.60c
Pacific ports, f.o.b. dock	2.95c

Hot Rolled Annealed No. 24

Pittsburgh	3.15c
Gary	3.25c
Chicago, delivered	3.28c
Detroit, delivered	3.35c
New York, del.	3.48c
Philadelphia, del.	3.44c
Birmingham	3.30c
St. Louis, del.	3.38c
Granite City, Ill.	3.35c
Pacific ports, f.o.b. dock	3.80c

Galvanized No. 24

Pittsburgh	3.80c
Gary	3.90c
Chicago, delivered	3.93c
Philadelphia, del.	4.09c
New York, delivered	4.13c
Birmingham	3.95c
St. Louis, del.	4.03c
Granite City, Ill.	4.00c
Pacific ports, f.o.b. dock	4.40c

Tin Mill Black No. 28

Pittsburgh	3.30c
Gary	3.40c
St. Louis, delivered	3.53c
Granite City, Ill.	3.50c

Cold Rolled No. 10

Pittsburgh	3.10c
Gary	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.39c
New York, del.	3.43c
St. Louis, del.	3.33c
Granite City, Ill.	3.30c
Pacific ports, f.o.b. dock	3.70c

Cold Rolled No. 20

Pittsburgh	3.55c
Gary	3.65c
Detroit, delivered	3.75c
Philadelphia, del.	3.84c
New York, del.	3.88c
St. Louis	3.78c
Granite City, Ill.	3.75c

Enameling Sheets

Pittsburgh, No. 10	2.90c
Pittsburgh, No. 20	3.50c
Gary, No. 10	3.00c
Gary, No. 20	3.60c
St. Louis, No. 10	3.13c
St. Louis, No. 20	3.73c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke, (base box), Pittsburgh	$5.35
Waste-waste, 2.75c; strip	2.50c
Long ternes, No. 24, unassorted, Pitts.	4.10c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.25c
New York, del.	2.53c
Philadelphia, del.	2.43½c
Boston, delivered	2.65c
Buffalo, delivered	2.50c
Chicago or Gary	2.30c
Cleveland, del.	2.44½c
Birmingham	2.40c
Coatesville, base	2.35c
Sparrows Pt., base	2.35c
Pacific ports, f.o.b. cars, dock	2.80c
St. Louis, delivered	2.52c

Structural Shapes

Pittsburgh	2.25c
Philadelphia, del.	2.45¼c
New York, del.	2.50¼c
Boston, delivered	2.63¼c
Bethlehem	2.35c
Chicago Chicago	2.30c
Cleveland, del.	2.45c
Buffalo	2.35c
Gulf Ports	2.65c
Birmingham	2.40c
Pacific ports, f.o.b. cars, dock	2.80c
St. Louis, del.	2.52c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.45c
Chicago or Gary	2.50c
Duluth	2.60c
Birmingham	2.60c
Cleveland	2.50c
Buffalo	2.55c
Detroit, delivered	2.60c
Pacific ports, f.o.b. cars, dock	3.00c
Philadelphia, del.	2.74c
Boston, delivered	2.85c
New York, del.	2.78c
Pitts., forg. qual.	2.80c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.30c
Chicago or Gary	2.35c
Moline, Ill.	2.35c
Cleveland	2.35c
Buffalo	2.40c

Iron

Terre Haute, Ind.	2.35c
Chicago	2.40c
Philadelphia	2.64c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.55c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.60c
Gulf ports	2.65c
Pacific coast ports, f.o.b. car docks	2.95c
Philadelphia, del.	2.84c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	2.40c
Chicago, Buffalo, Cleveland, Birm., Young.	2.45c
Gulf ports	2.80c

Wire Products

Prices apply to straight or mixed carloads; less carloads $5 higher; less carloads fencing $5 over base column.

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.75
Cement coated nails	$2.75

(Per pound)

Polished staples	3.45c
Galv. fence staples	3.70c
Barbed wire, galv.	3.40c
Annealed fence wire	3.20c
Galv. fence wire	3.60c
Woven wire fencing (base column, c. l.)	$74.00
Single loop bale ties, (base column, c. l.)	63.00

To Manufacturing Trade

Plain wire, 6-9 ga.	2.90c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth and Worcester up $2; Birmingham up $3.

Spring wire, Pitts. or Cleveland	3.50c

Do., Chicago up $1, Worc. $2.

Cold-Finished Carbon Bars and Shafting

Pittsburgh	2.90c
Chicago	2.95c
Gary, Ind.	2.95c
Detroit	2.95c
Cleveland	2.95c
Buffalo	3.00c

Subject to quantity deductions and extras. List dated Aug. 26, 1935; revised Oct. 1, 1936.

Alloy Steel Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	3.00c

Alloy	Diff.	Alloy	Diff.
S.A.E.		S.A.E.	
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55

4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10

5100 0.80-1.10 Cr.	0.45
5100 Cr. spring	0.15
6100 bars	1.20
6100 spring	0.85
Cr. N., Van	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Piling

Pittsburgh	2.60c
Chicago, Buffalo	2.70c

Strip and Hoops

(Base, hot rolled, 25-1ton)
(Base, cold-rolled, 25-3 tons)

Hot strip to 23⅛-in. Pittsburgh	2.40c
Chicago or Gary	2.50c
Birmingham base	2.55c
Detroit, del.	2.60c
Philadelphia, del.	2.69c
New York, del.	2.73c
Cooperage hoop, Pittsburgh	2.50c
Chicago	2.60c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland	3.20c
Detroit, del.	3.40c
Worcester, Mass.	3.40c

Carbon	Cleve. Pitts.	Worcester, Mass.
0.26—0.50	3.20c	3.40c
0.51—0.75	4.45c	4.65c
0.76—1.00	6.30c	6.50c
Over 1.00	8.50c	8.70c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$42.50
Relay rails, Pittsburgh, 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pittsburgh, Chicago	$43.00
Do., rerolling quality	42.00
Angle bars, billet, Gary, Pittsburgh, So. Chicago	2.80c
Do., axle steel	3.35c
Spikes, R. R. base	3.15c
Track bolts, base	4.35c
Tie plates, base	$46.00

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists:

Carriage and Machine

½ x 6 and smaller	65-5 off
Do. larger	60-10 off
Tire bolts	50 off

Plow Bolts

All sizes	65-5 off

Stove Bolts

In packages with nuts attached 72½ off; in packages with nuts separate 72½-5 off; in bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	60 off
Elevator bolts	50-10-5 off

Nuts

S. A. E. semifinished hex.: ½ to 7/16-inch	60-10 off
Do., ½ to 1-inch	60-5 off
Do., over 1-inch	60 off

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	75 off
Headless set screws	75 off

Rivets, Wrought Washers

Structural, Pittsburgh, Cleveland	3.60c
Structural, Chicago	3.70c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-5 off
Wrought washers, Pitts., Chi., Phila. to jobbers and large nut, bolt mfrs.	$5.75 off

Cut Nails

Cut nails, C. L., Pitts. (10% disc. on all extras)	$3.60
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
½	59½	49
¾	62½	53
1—3	64½	55½

Iron

¾	26	8
1—1¼	30	14
1½	34	16½
2	33½	16

Lap Weld

Steel

2	57	47½
2½—3	60	50½
3½—6	62	52½
7 and 8	61	50½
9 and 10	60½	50

Iron

2	26½	10
2½—3½	27½	12½
4	29½	16
4½—8	28½	15
9–12	24½	10

Line Pipe

Steel

1 to 3, butt weld	63½
2, lap weld	56
2½ to 3, lap weld	59
3½ to 6, lap weld	61
7 and 8, lap weld	60
10-inch, lap weld	59½
12-inch, lap weld	58½

Butt Weld

Iron

	Blk.	Galv.
¾	25	7
1 and 1¼	29	18
1½	33	15½
2	32½	15

Lap Weld

1½	23½	17
2	25½	9
2½ to 3½	26½	11½
4	28½	15
4½ to 8	27½	14
9 to 12	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Weld

Sizes	Steel	Charcoal Iron
1½" OD x 13 Ga.	$10.45	$28.71
1¾" OD x 13 Ga.	11.89	22.93
2" OD x 13 Ga.	13.31	19.35
2" OD x 11 Ga.	15.49	23.36
2¼" OD x 13 Ga.	14.82	21.68
2¼" OD x 11 Ga.	17.38	26.02
2½" OD x 12 Ga.	17.82	26.57
2¾" OD x 12 Ga.	18.86	29.00
3" OD x 12 Ga.	19.73	31.36
3½" OD x 11 Ga.	24.89	39.81
4" OD x 10 Ga.	30.81	49.90
5" OD x 9 Ga.	47.57	73.93
6" OD x 7 Ga.	73.25	.....

Seamless

	Hot Rolled	Cold Drawn
1" OD x 13 Ga.	$ 8.41	$ 9.46
1¼" OD x 13 Ga.	9.96	11.21
1½" OD x 13 Ga.	11.00	12.38
1¾" OD x 13 Ga.	12.51	14.09
2" OD x 13 Ga.	14.02	15.78
2¼" OD x 13 Ga.	15.63	17.60
2¼" OD x 12 Ga.	17.21	19.37
2½" OD x 12 Ga.	18.85	21.22
2¾" OD x 12 Ga.	19.98	22.49
3" OD x 12 Ga.	20.97	23.60
4½" OD x 10 Ga.	40.15	45.19
3½" OD x 11 Ga.	26.47	29.79
4" OD x 10 Ga.	32.83	36.96
5" OD x 9 Ga.	50.38	56.71
6" OD x 7 Ga.	77.35	87.07

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$46.00-47.00
4-in., Birmingham	49.00-50.00
4-in., Chicago	57.00-58.00
6 to 24-in., Chicago	54.00-55.00
6-in. & over, east fdy.	50.00
Do., 4-in.	53.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Billets and Blooms

4 x 4-*inch base; gross ton*

Pitts., Chi., Cleve., Buffalo and Young.	$37.00
Philadelphia	42.30
Duluth	39.00

Forging Billets

6 x 6 *to* 9 x 9-*in., base*

Pitts., Chicago, Buffalo	43.00
Forging, Duluth	45.00

Sheet Bars

Pitts., Cleve., Young., Sparrows Point	37.00

Slabs

Pitts., Chicago, Cleveland, Youngstown	37.00

Wire Rods

Pitts., Cleve., No. 5 to 9/32-inch incl.	47.00
Do., over 9/32 to 11/64-inch incl.	52.00

Chicago up $1; Worcester up $2.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	2.10c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$4.75- 4.90
Connellsville, fdry.	5.25- 5.50
Connell. prem. fdry.	6.00- 6.50
New River fdry.	6.50- 6.75
Wise county fdry.	5.75- 6.00
Wise county fur.	4.75- 5.00

By-Product Foundry

Newark, N. J., del.	10.85-11.30
Chi., ov., outside del.	10.25
Chicago, del.	11.00
Milwaukee, ovens	11.00
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.25
Indianapolis, del.	10.50
Cincinnati, del.	10.50
Cleveland, del.	11.00
Buffalo, del.	10.50
Detroit, del.	11.10
Philadelphia, del.	10.60

Coke By-Products

Spot, gal. Producers' Plants

Pure and 90% benzol	16.00c
Toluol	30.00c
Solvent naphtha	30.00c
Industrial xylol	30.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	14.75c
do. (450 lbs.)	14.00c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls. to jobbers	7.25c

Per 100 lbs. Atlantic Seaboard

Sulphate of ammonia	$1.35

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:

	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$25.00	$25.50	$23.50	$26.00
Birdsboro, Pa.	25.00	25.50	24.50	26.00
Birmingham, Ala.‡	20.38	.....	19.38	24.50
Buffalo	24.00	24.50	23.00	25.00
Chicago	24.00	24.00	23.50	24.50
Cleveland	24.00	24.00	23.50	24.50
Detroit	24.00	24.00	23.50	24.50
Duluth	24.50	24.50	.....	25.00
Erie, Pa.	24.00	24.50	23.50	25.00
Everett, Mass.	25.75	26.25	25.25	26.75
Hamilton, O.	24.00	24.00	23.50	.....
Jackson, O.	24.00	24.00	.....	.....
Neville Island, Pa.	24.00	24.00	23.50	24.50
Provo, Utah	22.00	.....	.....	.....
Sharpsville, Pa.	24.00	24.00	23.50	24.50
Sparrows Point, Md.	25.00	.....	24.50	.....
Swedeland, Pa.	25.00	25.50	24.50	26.00
Toledo, O.	24.00	24.00	23.50	24.50
Youngstown, O.	24.00	24.00	23.50	24.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	25.26	25.26	24.76	25.76
Baltimore from Birmingham	25.58	.....	24.46	.....
Boston from Birmingham	26.87	.....	25.87	.....
Boston from Everett, Mass.	26.25	26.75	25.75	27.25
Boston from Buffalo	26.25	26.75	25.75	27.25
Brooklyn, N. Y., from Bethlehem	27.27	27.77	.....	.....
Brooklyn, N. Y., from Bmghm.	27.05	.....	.....	.....
Canton, O., from Cleveland	25.26	25.26	25.76	25.76
Chicago from Birmingham	24.22	.....	24.10	.....
Cincinnati from Hamilton, O.	24.07	25.01	24.51	.....
Cincinnati from Birmingham	23.69	.....	22.69	.....
Cleveland from Birmingham	24.12	.....	23.62	.....
Mansfield, O., from Toledo, O.	25.76	25.76	25.26	25.26
Milwaukee from Chicago	25.00	25.00	24.50	25.00
Muskegon, Mich., from Chicago, Toledo or Detroit	26.90	26.90	26.40	27.40
Newark, N. J., from Birmingham	26.01	.....	.....	.....
Newark, N. J., from Bethlehem	26.39	26.89	.....	.....
Philadelphia from Birmingham	25.38	.....	25.26	.....
Philadelphia from Swedeland, Pa.	25.76	26.26	25.26	.....
Pittsburgh district from Neville Island	Neville, base plus 63c, 76c, and $1.13 switch'g charges			
Saginaw, Mich., from Detroit	26.25	26.25	25.75	25.75
St. Louis, northern	24.50	24.50	24.00	.....
St. Louis from Birmingham	†24.12	.....	23.82	.....
St. Paul from Duluth	25.94	25.94	.....	26.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $28.50, Phila. base, standard and copper bearing, $29.63.

Gray Forge		Charcoal	
Valley furnace	$23.50	Lake Superior fur.	$27.00
Pitts. dist. fur.	23.50	do., del. Chicago	30.04
		Lyles, Tenn.	26.50

Silvery†

Jackson county, O., base: 6-6.50 per cent $28.50; 6.51-7—$29.00; 7-7.50—$29.50; 7.51-8—$30.00; 8-8.50—$30.50; 8.51-9—$31.00; 9-9.50—$31.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	41.80

Ohio

First quality	43.70
Intermediate	39.90
Second quality	35.15

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	59.85
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$30.00
Wire cut	$28.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	43.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk)	25.00

Base Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$49.00
Chem. bonded chrome	49.00
Magnesite brick	69.00
Chem. bonded magnesite	59.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$19.00
Do., for barge	$20.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82%, tidewater, duty pd.	$102.50
Do., Baltimore, base	102.50
Do., del. Pittsburgh	107.29
Spiegeleisen, 19-21% dom. Palmerston, Pa., spot	33.00
Do., New Orleans	33.00
Ferrosilicon, 50% freight allowed, c.l.	69.50
Do., less carload	77.00
Do., 75 per cent	126-130.00
Spot, $5 a ton higher.	
Silicoman., 2½ carbon	106.50
2% carbon 111.50; 1%	121.50
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.	10.50
Ferrotungsten, stand., lb. con. del. cars	1.80-1.85
Ferrovanadium, 35 to 40% lb., cont.	2.70-2.90
Ferrotitanium, c. l., prod. plant, frt. all., net ton	142.50
Spot, carlots	145.00
Spot, ton lots	150.00
Ferrophosphorous, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $3 unitage	58.50
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $3 unitage	75.00
Ferromolybdenum, stand. 55-65%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads. Quan. diff. apply

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper										
	Electro, del. Conn.	Lake, del. Midwest	Casting, refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
May 8	14.00	14.12½	13.75	55.25	54.75	6.00	5.85	6.75	20.00	17.00	35.00
May 10	14.00	14.12½	13.75	55.25	54.75	6.00	5.85	6.75	20.00	17.00	35.00
May 11	14.00	14.12½	13.75	54.62½	54.12½	6.00	5.85	6.75	20.00	17.00	35.00
May 12	14.00	14.12½	13.75	54.87½	54.37½	6.00	5.85	6.75	20.00	17.00	35.00
May 13	14.00	14.12½	13.75	54.62½	54.12½	6.00	5.85	6.75	20.00	17.00	35.00
May 14	14.00	14.12½	13.75	54.75	54.37½	6.00	5.85	6.75	20.00	16.00	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 14.00c *Conn. copper*

Sheets

Yellow brass (high)	19.50
Copper, hot rolled	21.62½
Lead, cut to jobbers	9.50
Zinc, 100-lb. base	12.50-13.00

Tubes

High yellow brass	22.25
Seamless copper	22.37½

Rods

High yellow brass	16.00
Copper, hot rolled	18.37½

Anodes

Copper, untrimmed	18.87½

Wire

Yellow brass (high)	19.75

OLD METALS

Nom. Deal. buying prices

No. 1 Composition Red Brass

New York	9.25
*Cleveland	9.00-9.50
*Chicago	9.00-9.25
St. Louis	8.50-8.75

Heavy Copper and Wire

*New York, No. 1	11.50
Cleveland, No. 1	11.00-11.25
*Chicago, No. 1	11.00-11.25
*St. Louis, No. 1	10.50-10.75

Composition Brass Borings

New York	8.75

Light Copper

New York	9.50
Cleveland	9.00-9.25
*Chicago	8.75-9.00
*St. Louis	9.00-9.50

Light Brass

*Chicago	5.75-6.00
*Cleveland	5.00-5.25
*St. Louis	5.25-5.50

Lead

New York	4.25- 4.50
*Cleveland	4.75- 5.00
Chicago	4.75- 5.00
St. Louis	4.75- 5.00

Zinc

New York	3.25- 3.50
Cleveland	3.00- 3.35
*St. Louis	3.00- 3.50

Aluminum

*Borings, Cleveland	10.00 10.50
*Mixed, cast, Cleve.	13.25-13.50
*Clips, soft, Cleve.	15.00-15.50
Mixed, cast, St. L.	13.00-13.50

SECONDARY METALS

Brass, ingot 85-5-5-5, lcl.	14.00
Stand. No. 12 alum.	19.00-19.50

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore	4.00c
Boston††	4.05c
Buffalo	3.10c
Chattanooga	3.96c
Chicago (j)	3.85c
Cincinnati	4.05c
Cleveland	3.75c
Detroit	3.93½c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.96c-4.11c
New Orleans	4.20c
New York‡ (d)	4.12c
Pitts. (h)	3.80c
Philadelphia	4.00c
Portland	4.45c
San Francisco	4.20c
Seattle	4.45c
St. Louis	4.09c
St. Paul	4.10c-4.25c
Tulsa	3.35c

IRON BARS

Portland	3.50c
Chattanooga	3.96c
Baltimore*	3.25c
Cincinnati	4.05c
New York‡ (d)	3.65c
Philadelphia	4.00c
St. Louis	4.09c
Tulsa	3.35c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.96c
Cleveland (c)	2.55c
Cincinnati	3.75c
Houston	3.25c
Los Angeles, c.l.	2.45c
New Orleans*	3.14c
Pitts., plain (h)	2.55c
Pitts., twisted squares (h)	3.95c
San Francisco	2.97½c
Seattle, under 1 ton	4.22½c
St. Louis	3.99c
Tulsa	3.25c
Young	2.30c-2.60c

SHAPES

Baltimore	3.90c
Boston††	3.92c
Buffalo	3.35c
Chattanooga	4.01c
Chicago	3.75c
Cincinnati	3.95c
Cleveland	3.86c
Detroit	3.95c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York‡ (d)	3.97c
Philadelphia	3.90c
Pittsburgh (h)	3.70c
Portland (i)	4.45c
San Francisco	4.05c
Seattle (i)	4.45c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

PLATES

Baltimore	3.90c
Boston††	3.93c
Buffalo	3.47c
Chattanooga	4.01c
Chicago	3.75c
Cincinnati	3.95c
Cleveland, ¼-in. and over	3.86c
Detroit	3.95c
Detroit, ⅜-in.	4.15c
Houston	3.10c
Los Angeles	4.30c
Milwaukee	3.86c
New Orleans	4.10c
New York‡ (d)	4.00c
Philadelphia	3.90c
Phila. floor	4.95c
Pittsburgh (h)	3.70c
Portland	4.25c
San Francisco	4.05c
Seattle	4.25c
St. Louis	3.99c
St. Paul	4.00c
Tulsa	3.60c

NO. 10 BLUE

Baltimore	3.95c
Boston (g)	4.00c
Buffalo	3.72c
Chattanooga	3.91c
Chicago	3.85c
Cincinnati,	4.00c
Cleveland	3.91c
Det. 8-10 ga.	3.93½c
Houston	3.45c
Los Angeles	4.50c
Milwaukee	3.96c
New Orleans	4.35c
New York‡ (d)	4.07c
Portland	4.50c
Philadelphia	4.00c
Pittsburgh (h)	3.75c
San Francisco	4.30c
Seattle	4.50c
St. Louis	4.39c
St. Paul	4.10c
Tulsa	3.80c

NO. 24 BLACK

Baltimore*†	4.50c
Boston (g)	4.75c
Buffalo	3.35c
Chattanooga*	4.06c
Chicago	4.45c-5.10c
Cincinnati	4.75c
Cleveland	4.66c
Detroit	4.68½c
Los Angeles	5.05c
Milwaukee	4.56c-5.21c
New York‡ (d)	4.82c
Philadelphia	4.65c
Pitts.** (h)	4.75c
Portland	5.35c
Seattle	5.35c
San Francisco	5.15c
St. Louis	4.84c
St. Paul	4.75c
Tulsa	4.85c

NO. 24 GALV. SHEETS

Baltimore*†	4.70c
Buffalo	4.10c
Boston (g)	5.30c
Chattanooga*	4.76c
Chicago (h)	5.10c-5.75c
Cincinnati	5.40c
Cleveland	5.31c
Detroit	5.40c
Houston	4.50c
Los Angeles	5.55c
Milwaukee	5.21c-5.86c
New Orleans*	4.49c
New York‡ (d)	5.47c
Philadelphia	5.30c
Pitts.** (h)	5.40c
Portland	5.90c
San Francisco	5.85c
Seattle	5.90c
St. Louis	5.49c
St. Paul	5.40c
Tulsa	5.20c

BANDS

Baltimore	4.20c
Boston††	4.25c
Buffalo	3.52c
Chattanooga	4.16c
Cincinnati	4.25c
Cleveland	4.16c
Chicago	4.10c
Detroit, ⅜-in. and lighter	4.185c
Houston	3.35c
Los Angeles	4.50c
Milwaukee	4.21c
New Orleans	4.75c
New York‡ (d)	4.32c
Philadelphia	4.10c
Pittsburgh (h)	4.00c
Portland	4.95c
San Francisco	4.50c
Seattle	4.95c
St. Louis	4.34c
St. Paul	4.35c
Tulsa	3.55c

HOOPS

Baltimore	4.45c
Boston††	5.25c
Buffalo	3.52c
Chicago	4.10c
Cincinnati	4.25c
Detroit, No. 14 and lighter	4.185c
Los Angeles	6.55c
Milwaukee	4.21c
New York‡ (d)	4.32c
Philadelphia	4.35c
Pittsburgh (h)	4.50c
Portland	6.30c
San Francisco	6.50c
Seattle	6.30c
St. Louis	4.34c
St. Paul	4.35c

COLD FIN. STEEL

Baltimore (c)	4.50c
Boston*	4.65c
Buffalo (h)	3.70c
Chattanooga*	4.86c
Chicago (h)	4.30c
Cincinnati	4.50c
Cleveland (h)	4.30c
Detroit	4.30c
Los Ang. (f) (d)	6.85c
Milwaukee	4.41c
New Orleans	5.10c
New York‡ (d)	4.57c
Philadelphia	4.53c
Pittsburgh	4.15c
Portland (f) (d)	5.85c
San Fran. (f) (d)	6.80c
Seattle (f) (d)	5.85c
St. Louis	4.54c
St. Paul	4.77c
Tulsa	4.80c

COLD ROLLED STRIP

Boston	3.845c
Buffalo	3.39c
Chicago	3.87c
Cincinnati	3.82c
Cleveland (b)	3.60c
Detroit	3.43c
New York‡ (d)	3.92c
St. Louis	4.54c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up.)

	Base
High speed	69c
High carbon, Cr.	45c
Oil hardening	26c
Special tool	24c
Extra tool	20c
Regular tool	16c
Water hardening	12½c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	55 to 60
Cleveland	60-5-5
Detroit	70-10
Milwaukee	60 to 65
New Orleans	65
Pittsburgh	65-5

(a) Under 100 lbs., 50 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Quantity base; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in.; (j) Shapes other than rounds, flats, fillet angles, 0.15c higher.

On plates, shapes, bars, hot strip and blue annealed quantity extras and discounts as follows: Under 100 lbs., add $1.50; 100 to 399 lbs., add 50c; 400 to 3999 lbs., base; 4000 to 9999 lbs., deduct 10c; over 10,000 lbs., deduct 15c. At Cleveland, under 400 lbs., add 50c, with $1 minimum invoice.

‡Domestic steel; *Plus quantity extras; **One to 9 bundles; *† 50 or more bundles; †New extras apply; ††Base 10,000 lbs., extras on less.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, May 13

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	Continental Channel or North Sea ports, metric tons **Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$28.40 5 15 0	$32.04	3 19 6
Basic bessemer	19.39 3 18 6*	14.10	1 15 0
Hematite, Phos. .03-.05	21.61 4 7 6	.....	.....
SEMIFINISHED STEEL			
Billets	$38.90 7 17 6	$35.27	4 7 6
Wire rods, No. 5 gage	47.55 9 12 6	56.42	7 0 0
FINISHED STEEL			
Standard rails	$44.46 9 0 0	$48.36	6 0 0
Merchant bars	2.43c 11 0 0	1.82c	5 0 0
Structural shapes	2.35c 10 12 6	1.77c	4 17 6
Plates, †¼ in. or 5 mm.	2.55c 11 11 3	2.24c	6 2 6
Sheets, black, 24 gage or 0.5 mm.	3.31c 15 0 0	3.19c	8 15 0††
Sheets, gal., 24 gage, corr.	4.14c 18 15 0	4.37c	12 0 0
Bands and strips	2.21c 10 0 0	2.37c	6 10 0
Plain wire, base	2.43c 11 0 0	2.73c	7 10 0
Galvanized wire, base	3.20c 14 10 0	2.91c	8 0 0
Wire nails, base	3.09c 14 0 0	3.09c	8 10 0
Tin plate, box 108 lbs.	$ 6.05 1 4 6	.....	.....

British ferromanganese $95 delivered Atlantic seaboard, duty-paid.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$20.50 4 3 0(a)	$19.04	425	$27.80	825	$25.29	63
Basic bessemer pig iron	20.38 4 2 6(a)	12.32	275	14.66	435	27.90 (b)	69.50
Furnace coke	7.78 1 11 6	6.14	137	5.73	170	7.63	19
Billets	39.52 8 0 0	29.34	655	28.14	835	38.74	96.50
Standard rails	2.49c 11 5 6	1.95c	975	1.80c	1,200	2.38c	132
Merchant bars	2.10c 9 10 0	1.77c	885	1.46c	975	1.98c	110
Structural shapes	2.44c 11 0 6	1.72c	860	1.46c	975	1.93c	107
Plates, †¼-in. or 5 mm.	2.57c 11 13 0	2.21c	1,105	1.87c	1,245	2.29c	127
Sheets, black	3.09c 14 0 0§	2.80c	1,400‡	2.19c	1,400‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.75c 17 0 0	4.30c	2,150	2.85c	1,900	6.66c	370
Plain wire	2.60c 11 15 0	2.72c	1,360	2.48c	1,650	3.11c	173
Bands and strips	2.27c 10 5 0	2.00c	1,000	2.02c	1,350	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel, a del. Middlesbrough. b hematite. ††Close annealed.

**Gold pound sterling carries a premium of 65.50 per cent over paper sterling.

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham†	12.50-13.00
Bos. dock, No. 1, exp.	17.00
N. Eng. del. No. 1	16.00
Buffalo, No. 1	19.50-20.00
Buffalo, No. 2	17.50-18.00
Chicago, No. 1	17.00-17.50
Cleveland, No. 1	17.50-18.00
Cleveland, No. 2	16.00-16.50
Detroit, No. 1	15.50-16.00
Eastern Pa., No. 1	18.00-18.50
Eastern Pa., No. 2	16.50-17.00
Federal, Ill.	14.00-14.50
Granite City, R. R.	16.50-17.00
Granite City, No. 2	14.00-14.50
New York, No. 1	15.00-15.50
N. Y. dock, No. 1 exp.	16.00
Pitts., No. 1 (R. R.)	20.50-21.00
Pitts., No. 1 (dlr.)	19.50-20.00
Pittsburgh, No. 2	17.25-17.75
St. Louis, R. R.	16.00-16.50
St. Louis, No. 2	14.00-14.50
Toronto, dlrs. No. 1	11.00-12.00
Toronto, No. 2	10.00-11.00
Valleys, No. 1	20.00-20.50

COMPRESSED SHEETS

Buffalo, dealers	17.50-18.00
Chicago, factory	16.00-16.50
Chicago, dealer	15.50-16.00
Cleveland	17.00-17.50
Detroit	16.50-17.00
E. Pa., new mat.	18.50
E. Pa., old mat.	15.50-16.00
Pittsburgh	19.50-20.00
St. Louis	11.00-11.50
Valleys	19.50-20.00

BUNDLED SHEETS

Buffalo	14.00-14.50
Cincinnati, del.	13.00-13.50
Cleveland	13.50-14.00
Pittsburgh	18.00-18.50
St. Louis	12.00-12.50
Toronto, dealers	8.00

SHEET CLIPPINGS, LOOSE

Chicago	11.50-12.00
Cincinnati	12.00-12.50
Detroit	11.50-12.00
St. Louis	10.00-10.50

STEEL RAILS, SHORT

Birmingham	16.00-17.00
Buffalo	24.00-24.50
Chicago (3 ft.)	21.00-21.50
Chicago (2 ft.)	22.00-22.50
Cincinnati, del.	20.50-21.00
Detroit	20.50-21.00
Pitts., 3 ft. and less	25.00-25.50
St. Louis, 2 ft. & less	19.00-19.50

STEEL RAILS, SCRAP

Boston, district	†16.50
Buffalo	20.00-20.50
Chicago	17.00-17.50
Cleveland	23.00-23.50
Pittsburgh	22.00-22.50
St. Louis	17.50-18.00

STOVE PLATE

Birmingham	10.00-11.00
Boston district	†11.50-11.75
Buffalo	14.75-15.25
Chicago	12.00-12.50
Cincinnati, dealers	10.00-10.50
Detroit, net	11.25-11.75
Eastern Pa.	15.00-15.50
New York, fdry.	†11.00-11.50
St. Louis	11.50-12.00
Toronto, deal'rs, net	9.50-10.00

SPRINGS

Buffalo	22.00-23.00
Chicago, leaf	21.50-22.00
Chicago, coil	22.50-23.00
Eastern Pa.	25.00-25.50
Pittsburgh	25.00-25.50
St. Louis	20.50-21.00

ANGLE BARS—STEEL

Chicago	20.50-21.00
St. Louis	18.00-18.50

RAILROAD SPECIALTIES

Chicago	21.00-21.50

LOW PHOSPHORUS

Buffalo, billet and bloom crops	22.50-23.50
Cleveland, billet, bloom crops	24.00-24.50
Eastern Pa. crops	25.50-26.00
Pittsburgh, billet, bloom crops	25.50-26.00
Pittsburgh, sheet bar crops	25.50-25.50

FROGS, SWITCHES

Chicago	17.00-17.50
St. Louis, cut	17.50-18.00

SHOVELING STEEL

Chicago	17.00-17.50
Federal, Ill.	14.00-14.50
Granite City, Ill.	14.00-14.50
Toronto, dealers	9.00- 9.50

RAILROAD WROUGHT

Birmingham	12.00-13.00
Boston district	†10.00-10.25
Buffalo, No. 1	17.50-18.00
Buffalo, No. 2	19.50-20.00
Chicago, No. 1 net	15.50-16.00
Chicago, No. 2	17.00-17.50
Cincinnati, No. 2	16.00-16.50
Eastern Pa.	19.00
St. Louis, No. 1	14.50-15.00
St. Louis, No. 2	16.50-17.00
Toronto, No. 1 dlr.	15.00

SPECIFICATION PIPE

Eastern Pa.	17.00
New York	13.00-13.50

BUSHELING

Buffalo, No. 1	17.50-18.00
Chicago, No. 1	16.50-17.00
Cincin., No. 1, deal.	14.50-15.00
Cincinnati, No. 2	8.50- 9.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1 new	15.00-15.50
Valleys, new, No. 1	18.00-18.50
Toronto, dealers	9.00

MACHINE TURNINGS

Birmingham	7.50- 8.00
Buffalo	11.50-12.00
Chicago	10.50-11.00
Cincinnati, dealers	9.00- 9.50
Cleveland	12.50-13.00
Detroit	10.00-10.50
Eastern Pa.	13.00-13.50
New York	†9.00- 9.50
Pittsburgh	15.00-15.50
St. Louis	8.00- 8.50
Toronto, dealers	8.00- 8.50
Valleys	13.50-14.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	†7.75- 8.25
Buffalo	13.00-13.50
Cincinnati, dealers	8.50- 9.00
Cleveland	12.50-13.00
Detroit	11.00-11.50
Eastern Pa.	12.00-12.50
New York	†8.00- 8.50
Pittsburgh	14.00-14.50
Toronto, dealers	8.00- 8.50

CAST IRON BORINGS

Birmingham	7.50- 8.00
Boston dist. chem.	†10.00-10.25
Boston dist. for mills	†9.25
Buffalo	13.00-13.50
Chicago	10.50-11.00
Cincinnati, dealers	8.50- 9.00
Cleveland	12.50-13.00
Detroit	11.00-11.50
E. Pa., chemical	15.50
New York	†8.00- 8.50
St. Louis	8.00- 8.50
Toronto, dealers	9.00

PIPE AND FLUES

Cincinnati, dealers	11.50-12.00
Chicago, net	13.00-13.50

RAILROAD GRATE BARS

Buffalo	15.50-16.00
Chicago, net	12.50-13.00
Cincinnati	10.50-11.00
Eastern Pa.	15.00-15.50
New York	†10.00-10.50
St. Louis	12.50-13.00

FORGE FLASHINGS

Boston district	†11.50-11.75
Buffalo	18.00-18.50
Cleveland	17.00-17.50
Detroit	14.00-14.50
Pittsburgh	18.00-18.50

FORGE SCRAP

Boston district	†6.50- 7.00
Chicago, heavy	22.50-23.00
Eastern Pa.	16.00-16.50

ARCH BARS, TRANSOMS

St. Louis	18.50-19.00

AXLE TURNINGS

Boston district	†11.00-11.50
Buffalo	16.00-16.50
Chicago, elec. fur.	19.00-19.50
Eastern Pa.	17.00-17.50
St. Louis	12.50-13.00
Toronto	9.50

STEEL CAR AXLES

Birmingham	18.00-20.00
Buffalo	22.00-23.00
Boston district	†20.00-21.00
Chicago, net	23.00-23.50
Eastern Pa.	27.00-27.50
St. Louis	24.00-24.50

SHAFTING

Boston district	†19.50-19.75
New York	†20.00-20.50
Eastern Pa.	24.50
St. Louis	14.00-14.50

CAR WHEELS

Birmingham	16.50-17.50
Boston dist., iron	†15.00-15.25
Buffalo, iron	18.50-19.50
Buffalo, steel	22.50-23.50
Chicago, iron	19.50-20.00
Chicago, rolled steel	21.00-21.50
Cincinnati, iron	18.00-18.50
Eastern Pa., iron	22.00-22.50
Eastern Pa., steel	25.00-25.50
Pittsburgh, iron	20.50-21.00
Pittsburgh, steel	25.00-25.50
St. Louis, iron	19.00-19.50
St. Louis, steel	20.00-20.50

NO. 1 CAST SCRAP

Birmingham	12.00-13.00
Boston, No. 1 mach.	†15.50
N. Eng. del. No. 2	17.50
N. Eng. del. textile	18.50
Buffalo, cupola	18.00-18.50
Buffalo, mach.	19.25-19.75
Chicago, agri. net	13.00-13.50
Chicago, auto	14.50-15.00
Chicago, mach. net	15.00-15.50
Chicago, railr'd net	14.50-15.00
Cinci., mach. cup	15.50-16.00
Cleveland, mach.	20.00-20.50
Eastern Pa., cupola	20.00-20.50
E. Pa., mixed yard	17.50-18.00
Pittsburgh, cupola	18.75-19.25
San Francisco, del.	13.50-14.00
Seattle	12.00-13.00
St. Louis, No. 1	14.00-14.50
St. L., No. 1, mach.	15.00-15.50
Toronto, No. 1, mach., net	16.00-17.00

HEAVY CAST

Boston dist. break.	†13.00-13.25
New England, del.	17.00-17.25
Buffalo, break.	16.00-16.50
Cleveland, break.	14.00-15.00
Detroit, break.	14.50-15.00
Detroit, auto net	15.00-15.50
Eastern Pa.	18.00-18.50
New York, break.	†13.50-14.00
Pittsburgh	16.50-17.00

MALLEABLE

Birmingham, R. R.	12.50-13.50
New England, del.	20.00
Buffalo	22.00-22.50
Chicago, R. R.	20.00-20.50
Cincin., agri. del.	15.00-15.50
Cleveland, rail	20.50-21.00
Detroit, auto, net	16.50-17.00
Eastern Pa., R. R.	20.50-21.50
Pittsburgh, rail	20.50-21.00
St. Louis, R. R.	19.00-19.50

RAILS FOR ROLLING

5 feet and over

Birmingham	16.00-18.00
Boston	†18.00-18.50
Buffalo	21.00-21.50
Chicago	21.50-22.00
Eastern Pa., R. R.	21.00-21.50
New York	†18.00-18.50
St. Louis	18.50-19.00

LOCOMOTIVE TIRES

Chicago (cut)	21.50-22.00
St. Louis, No. 1	19.25-19.75

LOW PHOS. PUNCHINGS

Buffalo	22.00-22.50
Chicago	22.00-22.50
Eastern Pa.	25.50-26.00
Pittsburgh (heavy)	24.00-24.50
Pittsburgh (light)	23.00-23.50

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-10.00
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, f.a.s. Atlantic ports

Foreign manganiferous ore, 45.55% iron, 6-10% man.	*17.00
No. Afr. low phos.	17.00
Swedish low phos.	nominal
Spanish No. Africa basic, 50 to 60%	*15.50
Tungsten, spot sh. ton, unit, duty pd.	$22.00-22.50
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$24.50-25.00

*Nominal asking price for spot.

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52%	44.00
So. African, 50-52%	Nominal
Indian, 50-52%	Nominal

Sheets

Sheet Prices, Page 88

Pittsburgh — New sheet specifications were holding about even with shipments up to the middle of last week and backlogs on hot-rolled and galvanized showed no sign of diminishing. Orders were being accepted for fourth quarter with the stipulation that the price ruling at time of shipment would be paid. Although deliveries on cold reduced ranged around six weeks, on hot-rolled and galvanized it was difficult to obtain promises on most grades under 22 weeks. National galvanized operations were stepped up to around 77 per cent of capacity at the start of the week.

Cleveland—Specifications continue dull in contrast to a month ago, but shipments have held at practical capacity for mills are well booked and consumers are still in need of prompt deliveries as operations show no signs of slowing up. Quicker delivery can be obtained on cold-rolled, due to slackening in specifications from auto industry. Heavy demand has been noted for galvanized sheets, with backlogs extending well into August on some mills.

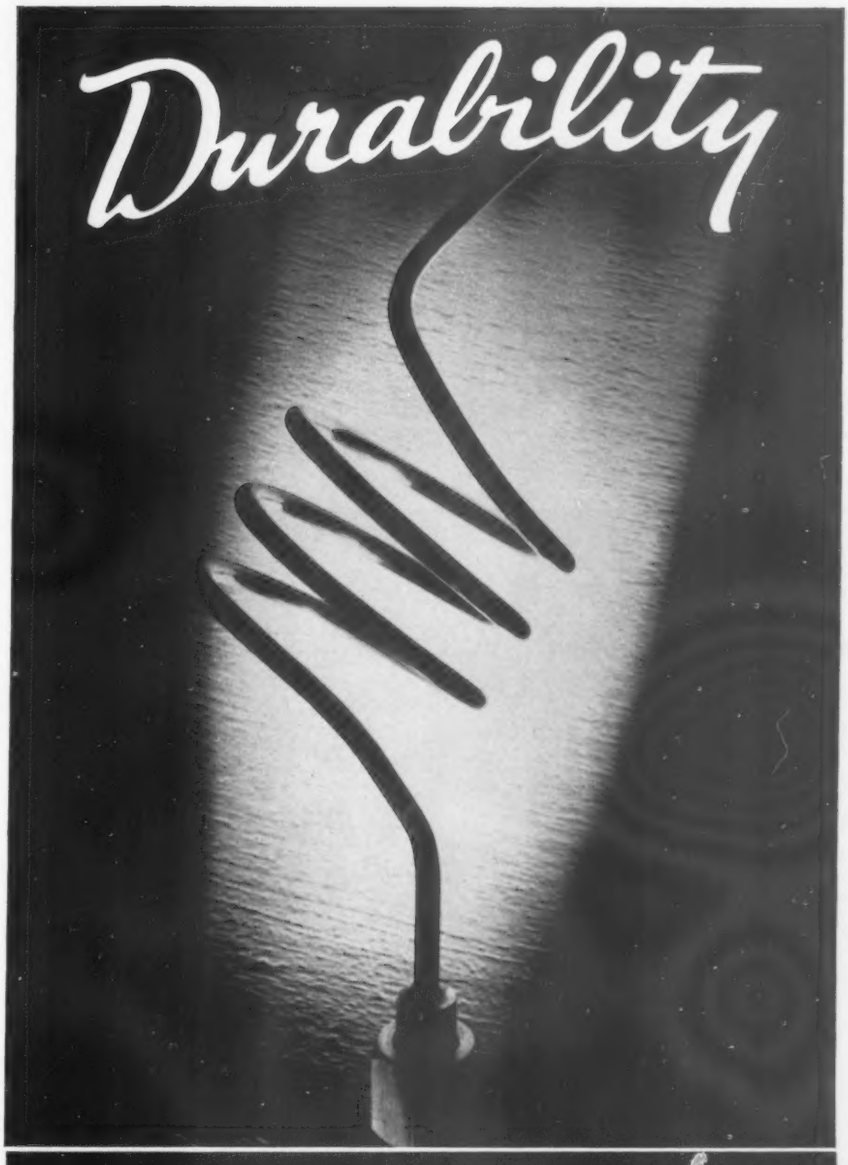
Chicago — New business is relatively light and mills are able to promise somewhat better deliveries. Shipments continue near capacity, and while consumption is holding well among important users, there is considerably less pressure for delivery than earlier in the year. New business from the automotive industry is light despite sustained consumption.

Boston—Sheet buying continues to taper slowly, the decline being well distributed among the various finishes. Deliveries are better, notably to jobbers, who in some instances, have until recently, been operating with uncomfortably low and unbalanced stocks.

New York—Sheet sales are slower and deliveries are much better. Some leading sellers still have little to offer before the middle of third quarter but some others can make deliveries on most grades during second quarter.

Carroll-McCreary Co. Inc., Brooklyn, has booked 262 tons of sheets for the Norfolk, Va., navy yard at $23,381, delivered; bids April 16.

Philadelphia — Sheet deliveries continue easier, despite the fact that sellers generally have many weeks work on their books. Improvement is particularly noticeable in cold-finished sheets and, in fact, it is possible for a consumer by virtue of a little shopping, to obtain shipments on most grades before the end of this quarter. In some cases sellers



BUNDYWELD Tubing is rolled from copper-coated steel. It is double-walled, copper finished on both sides, and electrically brazed into a dependable structure — unaffected by high temperatures and vibration. Its great strength has been conclusively proven in many bursting and vibration tests.

BUNDY TUBING CO.
DETROIT, MICHIGAN

are able to offer much improved shipments in galvanized sheets, which a few weeks ago were practically out of the question much before September. The Apollo Steel Co. was successful bidder on 300 tons of license tag stock for the state of Pennsylvania recently.

Buffalo—The new Bethlehem strip mill here may now be said to be in full operation. It is producing 3500 to 4000 tons of sheets weekly and its output is being expanded steadily as efficiency is advanced. Unfilled orders show little falling off.

Cincinnati—New orders for sheets have receded from recent peak levels and prompter delivery positions are available. Prompt shipment is being made on cold-rolled. Backlogs are adequate to hold operations at capacity through this quarter. The delivery situation is somewhat easier although considerable consumer pressure is still exerted.

St. Louis—Pressure for delivery on sheets previously ordered continues urgent, but with announcement of third quarter prices, the general situation has eased noticeably and new buying has subsided materially. Miscellaneous demands continue heavy.

Birmingham, Ala.—Sheet mills are working at a high rate and consumers are pressing for delivery, indicating the material is going into consumption at once.

Detroit's Newest Downtown Hotel

DETROIT LELAND

800 OUTSIDE ROOMS with BATH
$2.50 single $3.50 double

Famous for Fine Foods
Club Breakfasts—
30c . . . 50c . . . 75c
Lunches—
40c . . . 50c . . . 75c
Dinners—
75c . . . $1 . . . $1.25

From the moment you enter our doors you will know that here you are indeed a *guest*. You will appreciate the courteous, cheerful, but *unobtrusive* service for which the Leland is noted. You will revel in the luxury you have a right to expect in a hotel that's as modern as tomorrow's motor car. You will like the superbly convenient downtown location. We hope you will accept our invitation to make the Leland your home in Detroit.

GARAGE IN CONNECTION

(AT CASS AND BAGLEY AVENUES)
DETROIT

Strip

Strip Prices, Page 89

Pittsburgh — Strip mill backlogs, lowered since the buying peak, showed signs of a slight comeback last week, partly the result of the labor situation. Consumers sought to be protected as fully as possible. Promises on cold-rolled range around five weeks and on hot-rolled, three to four weeks. While automotive releases have been heavy, renewed buying from this source is possible. Mills here have been busier than usual on narrow widths. Hot strip is quoted 2.40c, Pittsburgh, and cold strip, 0.25 carbon and under, 3.20c, Pittsburgh or Cleveland.

Cleveland — New business in hot and cold-rolled strip has slackened to the extent specifications have fallen considerably behind shipments. However, mills have enough bookings to keep them busy through this quarter. Most consumers are well stocked and although operations are near capacity, they have shown little interest in ordering ahead since third quarter prices are to remain unchanged.

Chicago—With strip shipments in excess of new business, backlogs are declining and deliveries are improved slightly. Producers are faced with heavy operations during balance of this quarter, however, in view of substantial backlogs. Customers are less insistent on delivery but are maintaining heavy consumption.

Boston — Buying of narrow cold strip declines slowly, but on the whole incoming volume is substantial in view of recent heavy purchases. Deliveries have improved and some cold strip mills are able to ship in five weeks. Operations are high with shipments heavier than specifications. Backlogs gradually are being reduced. Hot strip deliveries are better and several mills are able to ship sooner than promised. Demand for cold-rolled is for widely diversified uses.

New York — For manufacturing purposes, notably consumer goods, demand for cold strip is holding well. Incoming tonnage continues to drop gradually, however, with deliveries on both cold and hot-rolled improved. Mill operations are near capacity in most departments, mak-

ing additional inroads on backlogs.

Philadelphia — Narrow strip, hot and cold rolled, is available for nearby delivery. Hot strip can be had at around two weeks in some cases and cold strip in three and four weeks. Strip specifications are lightest in several weeks. Prices are unchanged.

Plates

Plate Prices, Page 88

Philadelphia — While some mills are still sold well into next quarter, plate deliveries continue to show irregular improvement with universal plates available from some mills at three to four weeks, and sheared plates at four to five weeks. On the other hand, certain producers can do little under eight weeks with deliveries on certain specifications extending 12 to 14 weeks, reflecting in part, undoubtedly, heavy car business. Car work for the Reading Co. continues outstanding in pending inquiry, with the company having decided to take competitive bids on underframes, as well as for steel required for superstructures and other parts of the 700 cars to be built in its own shops. As noted in a recent issue, approximately 3000 tons or more of rolled steel will be required for the bodies. The company will also require some axles and wheels, indicating that used trucks will not be employed throughout. Reports that premiums have been asked for near deliveries have been stoutly denied in all producing quarters.

Pittsburgh—Plate mills have been unusually active here under steady demand from a wide range of sources, including railroad equipment builders, tank fabricators and other consumers. Aggregate operations, of course, suffered in midweek from the labor situation. Deliveries continue to range around 10 to 12 weeks on most sizes. Barge inquiries have been lighter than usual. Prices are steady.

Cleveland—Mill operations continue full, with backlogs supporting near capacity operations well into next quarter. A gradual decline in specifications is apparent but not to the extent of other steel products; deliveries remain close to fourteen weeks in most cases. Fabricators report a normal volume of spring business and expect little change through the remainder of the quarter.

Chicago — Plate shipments show no slackening, with a heavy movement to railroad equipment interests and car shops. Consumption by tank fabricators also is well sustained. Structural steel interests are seeking additional orders as heavy building construction has improved less rapidly than was anticipated. Plate mill backlogs are off moderately but deliveries generally extend into next quarter.

Boston—Tanks account for several hundred tons of new plate contracts. Pending requirements, largely supported by bridges and shipyards, with a slightly stronger miscellaneous demand, are heavier. Deliveries are considerably improved by several eastern mills.

New York — New plate tonnage has fallen off perceptibly. The delivery situation is gradually improving but is still well extended in most cases. New bids will be asked on the United States liner requiring about 16,000 tons of hull steel, but no date has been set.

Bids for two tankers requiring 5000 tons of hull steel each for Sinclair Navigation Co. have been postponed to June 10. Action on one to three ships for Panama Steamship Railway Co. has been postponed to the end of this month.

San Francisco—Awards of plates

REDUCES *friction* IN SALES

● Not unlike the Timken Bearing which reduces friction—is the "itinerant" or traveling display created for its promotion by *BECK & WALL·DISPLAYS*. Both product and merchandising medium retain something in common.

The *friction* or *irritant* that ofttimes comes between an otherwise excellent item and its acceptance to the trade, may frequently be traced to its *unsung* merits. A dealer-help in the form of a window or store display that is distinctive in its animation and glamour tends to build that *lasting impression* so vital to sales.

Let us create and build a display piece or exhibit that will reduce the *friction* in *your* sales.

BW

BECK and WALL·DISPLAYS

1800 EAST 30TH STREET
CLEVELAND OHIO

were limited to unimportant lots, aggregating only 210 tons and bringing the total for the year to 24,444 tons as compared with 66,079 tons for the corresponding period in 1936. Southwest Welding & Manufacturing Co. are low bidders on two 186-inch welded steel pipes for the All American Canal project near Calexico, Calif., calling for 550 tons. Bids have been taken by the metropolitan water district, Los Angeles, on 450 tons for a 30-inch welded steel pipe line. The Treasury Department at Portland is taking bids on approximately 100 tons for 30-inch shore pipe.

Seattle—Puget Sound Machinery Depot, Seattle, largest plant of its kind in this area, is running to capacity fabricating 8500 tons of water pipe for Everett, Wash., awarded jointly several months ago to it and Western Pipe & Steel Co., San Francisco.

Plate Contracts Placed

325 tons, 90,000-barrel tank, American Coal Co., Hartford, Conn., to Chicago Bridge & Iron Works, Chicago.

200 tons, 24-inch water pipe, Spokane, Wash., to Beall Tank & Pipe Co., Portland, Oreg.

165 tons, 1,175,000-gallon water tank, Brockport, N. Y., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Plate Contracts Pending

200 tons, 814,000-gallon tank, Westchester Joint water works, Mamaroneck, N. Y.

Unstated, 30-inch welded shoreline pipe; bids to state procurement officer, Portland, May 20.

Unstated, 39-inch welded outlet pipe for Grassy Lake dam, Idaho; bids to reclamation bureau, Ashton, Idaho, May 25.

Behind the Scenes with STEEL

Enlightened

FROM down in the valley comes this gem. Republic's bessemer was whoofing its fireworks high into the sky when four workers from a fabricating plant happened to pass it one night on the way home from second trick. One of them spoke.

"Say, just what is that thing, anyway?"

Another, proud of his ignorance, boasted. "Don't ask me. I've lived within sight of it for fourteen years and I don't know what it is."

"Why didn't you ask someone what it was?" the first one asked.

He shrugged. "I never wondered what it was." But in the car was a pundit who now raised his voice.

"I only been in town a few years and I know what it is."

"All right, buddy," they growled, "you tell us."

"Well," he said condescendingly, "it's a bettemer converser!"

* * *

Scrappy

LODESTONE for modern get-rich-quickers in this prewar era seems to be scrap. Rotting on the banks of the Cuyahoga river is an old scow which has been a playground for slum kids for years, known as the CAYUGA. Renamed ALBA and fitted out with a coat of paint, the tub is to be loaded with scrap and ferried over to Europe, where both boat and cargo will be sold. Captain and crew, enriched, will then ride home in luxury, living scrappily ever after. Also with a nautical twist is the story of the river bums in Pittsburgh who laboriously ferried three tons of $25 pig iron across the river from a barge to their houseboat under the impression they could sell it for $6 a ton. Two cops watched the whole thing, waited until it was all over and then made the boys carry it all back, the meanies.

* * *

Small Fry

LATEST bewailer against the machine is a Tennessee senator who claims the brain of man has devised a machine for slicing things and stuff so thin that bacon ground out therefrom is invisible on a white plate at a distance of more than three feet. The legislative one would introduce an ordinance restraining restaurants from serving slices of bacon shorter than 1⅜ inches in length and less than 1/132-inch in thickness. Here before our very eyes opens up an entirely new and rich field for the caliper makers. We can see them now—sleuths popping up from under your breakfast table in the Ritz de la Hitz and slapping a "mike" on that minute abutment supporting your egg.

* * *

Powerless

NEW photoelectric instrument recently announced by General Electric uses practically no power, according to the handsome (we've seen his picture) Mr. Sowersby of the GE news bureau. It uses 0.000000001-watt, which, our technical staff has just reported in a lather, works out to be one billionth of a watt, if we have all the zeros in the right places. Practically nothing at all, we can assure you. In fact, for a nickel's worth of juice you can run the darn thing for almost as long as old Am has been living on this planet. Wish our technical staff hadn't run off without telling us what it is used for, because our Scotch blood wells up in us at the thought of anything so economical.

* * *

Crownation

INFLUENCE of the now-history British heyday has at last appeared in STEEL's advertising. On page 45 of this week's book the Tomkins-Johnson Co. sets forth its crowning glory. Prominently displayed also is the London address of the company, just to give tne British touch needed, y'know. A bit of all roight, if we mye sye so.

* * *

Memoirs Mechanized

AUTOMATIC rememberer for fallible human memories has been developed by Westinghouse. We foresee the day when the device, shown on page 21, will be used to remember what restaurant you left that umbrella in. Only superior memory to the "memnoscope" is that of STEEL, from whose fount of knowledge were gathered those things to be remembered about machines you will read on the same page. Ah, memories! Ah, wilderness! Ah, nuts!

—SHRDLU

Bars

Bar Prices, Page 88

Pittsburgh — The labor situation resulted in increased pressure for bar shipments last week and aggregate operations were unusually high. Backlogs are four to six weeks. Farm equipment manufacturers are anxious for prompt shipments. New bar sizes for 1938 automotive models may be even later than last year in appearing among inquiries, due to high rate of assemblies. Hot-rolled carbon cars are quoted 2.45c, Pittsburgh.

Cleveland—Most mills are able to book tonnage for this quarter delivery on commercial carbon steel bars, but in alloy grades deliveries can not be made before the middle of July. Specifications have declined considerably from the peak in April. Demand for forging, cold-finished and alloy steel bars represents a good volume. Shipments continue steady at a high rate, as mills attempt to clear up extended backlogs.

Chicago — Farm implement and tractor manufacturers have been heavier buyers of bars lately but a gradual decrease is noted in demand elsewhere. Producers still have substantial backlogs which will necessitate heavy production during the balance of the quarter, however, and consumption as a whole is being maintained better than usual for this period. Farm equipment manufacturers are near the best operations in history, with no indications of a let-down. Bar deliveries show some improvement with the shrinkage in backlogs.

Boston—The decline in alloy and forging bar buying continues less pronounced than in carbon steel bars, new demand for the latter being light with improved deliveries on second quarter specifications.

Philadelphia — Commercial steel bar deliveries continue easier at around four weeks. Current buying has approached more normal proportions than at any time in re-

cent weeks. Prices are strong at 2.45c, Pittsburgh, or 2.74c, Philadelphia.

New York—With less labor tension at Pittsburgh commercial bar consumers are showing less apprehension over future supplies. Bar deliveries range around four to five weeks in most cases.

Pipe

Pipe Prices, Page 89

Pittsburgh—Specifications for oil country goods, standard pipe and mechanical tubing have been steady. In addition, several pipe lines for crude oil may develop to the contract stage within the next few months. Demand for standard pipe has increased due to seasonal building activity and backlogs in mechanical tubing are fairly large. Discounts on all tubular products are without change.

Cleveland — Requirements for standard steel pipe is holding well above normal as a good demand is realized from both industrial and domestic sources. Considerable tonnage is pending for the Industrial Rayon plant at Painesville, O., and the hockey rink, Cleveland. Cast iron pipe awards continue dull, limited to small jobs well under 100 tons. However, 360 tons is pending in a water extension project at Akron, O., and 100 tons in a new water supply development at Oberlin, O.

Chicago—While cast iron pipe orders include few large lots, a fairly large tonnage is involved in smaller awards recently. Detroit shortly will place 800 tons of 12-inch pipe and Chicago is in the market for 140 tons of 24-inch. Producers have acquired moderate backlogs which will support fairly heavy shipments during the next 60 days.

Boston—Cast pipe buying has again declined with most seasonal requirements already bought. An exception is in Southern New England where several large-tonnage inquiries are in the making. Utilities have placed less than expected following several years of meager buying. A steady demand holds for merchants' steel pipe and jobbers are replenishing stocks.

New York—Prices submitted on approximately 3000 tons of cement-lined cast iron pipe for New York city borough yard stocks, May 10, were near prevailing quotations. Three foundries will share in the contract. Buying is mostly for small fill-in needs, with inquiry heavier, about 5000 tons being up for bids with some alternates on steel. New Rochelle, N. Y., closes May 26 on 2000 tons, a contractor's letting.

Birmingham, Ala.—Cast pipe industry is keeping up fairly good spot buying of pig iron. Best business comes from the West.

San Francisco—Current inquiries for cast iron pipe are confined to less than 100-ton lots. Seasonal dullness prevails. Awards aggregated 510 tons and brought year's total to 15,252 tons, compared with 11,746 tons for the corresponding period in 1936.

Cast Pipe Placed

500 tons, 36-inch and under, with fittings, metropolitan district commission, Boston, to Warren Foundry & Pipe Corp., Everett, Mass.

400 tons, 6 and 12-inch, procurement division, treasury department, Boston, to United States Pipe & Foundry Co., Burlington, N. J.

200 tons, 4-inch, class 150, treasury department, Los Angeles, schedule 25621, to Pacific States Cast Iron Pipe Co., Provo, Utah.

180 tons, 4 to 12-inch, class 150, Santa Ana, Calif., to National Cast Iron Pipe Co., Birmingham, Ala.

Service!

1906 31 years 1937

QUALITY · DEPENDABILITY

DAMASCUS MANGANESE CASTINGS

Manganese and Alloy Steel Castings One Half to One Thousand Pounds Produced in our modernly equipped foundry from electric furnace steel and heat-treated in automatically controlled gas-fired furnaces.

The DAMASCUS STEEL CASTING CO.
New Brighton, Pa.
(*Pittsburgh District*)

DAMASCUS STEEL CASTINGS
(*Manganese and Alloy*)

104 tons, 4-inch, Hawthoren, Calif., to National Cast Iron Pipe Co., Birmingham, Ala.

Cast Pipe Pending

3022 tons, 24-inch and under, borough yard stocks, New York city; United States Pipe & Foundry Co., Burlington, N. J., low on 1405 tons; R. D. Wood & Co., Florence, N. J., 1006 tons, and Donaldson Iron Works, Emaus, Pa., 611 tons; bids May 10, department of purchase.

2000 tons, estimated, 35,000 feet, 20-inch and under, World's fair project, New York; bids May 26 with alternates on steel and cement on smaller sizes.

2000 tons, 36-inch and under, New Rochelle, N. Y.; bids May 26.

800 tons, 12-inch, Detroit; James B. Clow & Sons Co., Chicago, low.

140 tons, 24-inch, Chicago; bids May 25.

Unstated tonnage, 1400 feet 12-inch, Fox Point, suburb of Milwaukee; bids soon.

Transportation

Track Material Prices, Page 89

Rail mills in some instances still are unable to satisfy railroads on deliveries as spring tracklaying programs are being pushed. Backlogs are sufficient to support heavy mill operations into next quarter and from present indications there is a strong likelihood of supplementary buying appearing about that time.

Demand for bars, plates and shapes from freight car builders and railroad shops is well sustained and while orders are being worked off steadily, backlogs will support good shipments during the balance of this quarter.

Union Pacific has placed 3800 cars, part of which will be built in its own shops. Several locomotives and a small tonnage of rails have also been placed.

Rail Orders Placed

Board of Transportation, New York, 500 tons, to Bethlehem Steel Co., Bethlehem, Pa.; bids also have been opened on special track accessories for maintenance work for the Independent Subway system, for which the rails are required.

Columbus & Greenville, 1260 tons, to an unnamed producer.

Car Orders Placed

Union Pacific, 3800 freight cars, of which 1900 box and 700 automobile box cars will be built in its own shops; 1000 steel Hart ballast cars, 50 tons capacity, to the American Car & Foundry Co., New York, and 200 tank cars to General American Transportation Corp., Chicago; 2600 underframes to Ryan Car Co., Chicago.

Car Orders Pending

New York Rapid Transit Co., New York, 7-car light-weight articulated subway train for operation on Brooklyn-Manhattan Transit Lines; bids asked.

Locomotives Placed

Alton & Southern, one 2-8-2 locomotive, to American Locomotive Co., New York.

Southern Pacific, two rotary snow plows, to American Locomotive Co., New York.

Buses Booked

Twin Coach Co., Kent, O.; thirty-three 31-passenger, single deck, for Chicago Surface lines.

Wire

Wire Prices, Page 89

Pittsburgh — Wire consumption generally is active. Producers' shipments are comparable to April and one mill is slightly ahead of that month. Export inquiry on nails, rods and barbed wire showed a slight upturn last week. Promises on certain grades of wire rods under ten to twelve weeks are hard to obtain. Prices are steady.

Cleveland—Shipments continue at the high rate of the last few weeks, as consumption is well maintained. However, inquiries have declined materially from the peak in March. Demand for manufacturing and merchant products is slightly above normal as stocks are comparatively low.

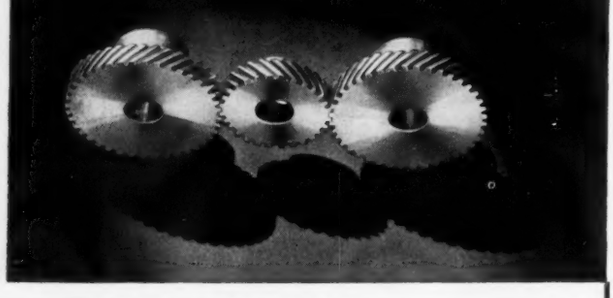
Chicago—Shipments of wire and wire products are holding well but sales and specifications are lighter. Consumers stocks are being curtailed, accounting for discrepancy between a high rate of consumption and lighter demand. Manufacturers' wire users generally hold to steady schedules, while there is fair activity in merchant products in rural districts.

Boston — Specifications against commitments are maintained but new buying continues downward in orderly manner. Manufacturers' wire and specialty shipments are heavy with improvement in delivery on most items. Mill operations are high, limited in some departments by supplies of semi-finished steel. Acid steel production is substantial. Prices are strong and unchanged.

New York—New wire tonnage being booked is below heavy current shipments. Mill operations are high, sustained by good backlogs. Some mills have low-priced tonnage booked last quarter for forward delivery yet to be shipped. Others who restricted such bookings have cleared this volume. No cancellations are reported, although there is less pressure for delivery, especial-

GRANT GEARS

Sixtieth GRANT YEAR 1877-1937



SPECIAL GEARS—Made quickly and accurately
STOCK GEARS—Delivered from large reserve

GRANT GEAR WORKS—Boston

ly of merchant products. Drop in buying has been well distributed. Electrical goods are slightly more active than last month, due largely to steadier copper. Sustained diversified demand prevails for wire rope. High manufacturers' wire consumption indicates additional buying by some consumers.

Shapes

Structural Shape Prices, Page 88

New York — Because of a clause providing cancellation of contracts resulting from labor trouble, no bids were submitted on the construction of four New York schools, May 11, involving 3600 tons. Awards are light, new tonnage coming out in greater volume, than current buying. Bridges and other public work requirements are heavier. Contracts placed involved 750 tons, railroad bridge, Newark, N. J., with 5000 tons to be out soon for a viaduct, Dyckman street, New York.

Boston — Additional bridge requirements in several New England States supplement 2025 tons required for Massachusetts spans bid last week, Coleman Bros. Corp. being low on the largest, 1065 tons, Merrimack River, Lowell. A fair number of structural contracts are being placed, small individual tonnages as a rule. District fabricating shops have backlogs for several weeks of substantial operation.

Philadelphia—While there are two sizable bridge projects on which bids were opened last week in the Baltimore-Washington area, district fabricators see little outstanding up for action here before next month. There is an increasing volume of work being figured, although not yet ready for active bidding. Recent awards have been small. Shapes are steady at 2.35c, Bethlehem, or 2.455c, New York.

Buffalo—Demand for close to 10,000 tons of structural steel is pending. The John W. Cowper Co. apparently was low bidder on a new jail to cost $750,000 here. The board of education in Kenmore, a local suburb, had a 2000-ton school building in prospect and numerous other fabricators' jobs were said to be ready for early bids.

Pittsburgh — Shape awards and inquiries continue heavy. American Bridge Co., Pittsburgh, was awarded 4100 tons for the International bridge, American crossing, by the Thousand Islands bridge authority, Clayton, N. Y. Pending business includes 1840 tons for a state highway bridge in Carbon county, Pennsylvania, and 1100 tons for a building for the Owens-Illinois Can Co., St. Louis.

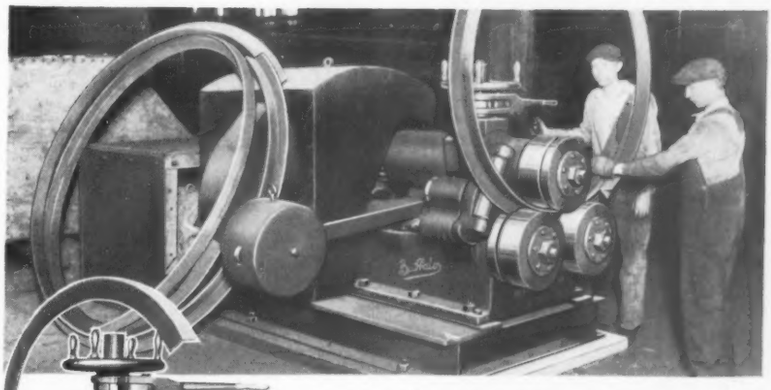
Cleveland—Structural market was marked with little interest throughout the week. Outside of the 270 tons award to the Burger Iron Co., Akron, O., for the Ohio Crankshaft Co.'s factory at Cleveland, awards were confined to small lots. However, pending tonnage is larger with over 1500 tons involved in a vocational school at Toledo, O., on which J. H. Berkebile & Sons Co., Toledo, O., received the general contract,

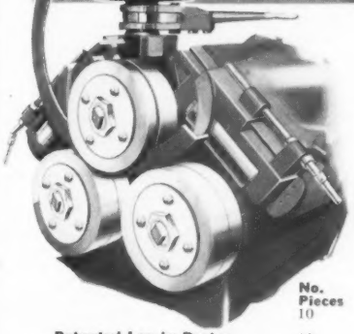
Shape Awards Compared

	Tons
Week ended May 15	**14,946**
Week ended May 8	**25,213**
Week ended May 1	**19,003**
This week, 1936	**40,039**
Weekly average, 1936	**16,332**
Weekly average, 1937	**26,739**
Weekly average, April	**28,197**
Total to date, 1936	**408,275**
Total to date, 1937	**534,778**

Includes awards of 100 tons or more.

A "Buffalo" BENDING ROLL did the job in 1/13th the time





● When one of the world's most prominent steel fabricators wanted to reduce his high cost for curving angles, the engineers decided to install a "Buffalo" Bending Roll. The results were so amazing that they wrote us giving complete data, some of which we list below.

These are actual figures from our shop records of man hours for curving angles by our old method compared with the new "Buffalo" angle roll. Some of the saving is due to being able to do the work with fewer men and some is due to the speed of operation. You will note we gain considerably by being able to curve six-inch leg-in on small radius work.

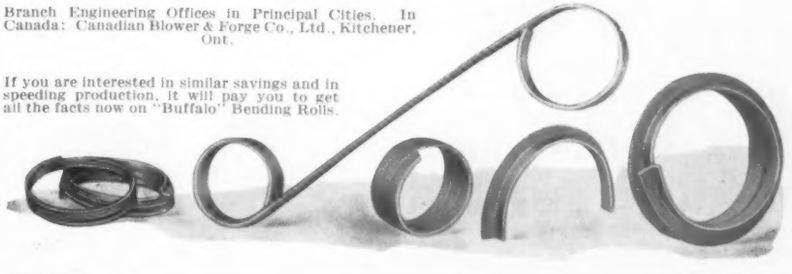
Patented Leg-in Device
Speeds production—avoids necessity of extra work on angles after bending operation. Automatically holds angle at 90 degrees. Soon pays its cost.

No. Pieces	Sizes & Length	Curved to Radius	Man Old	Man New	Hours Ratio
10	4x4x⅝ 38'0"	58' Leg-in	11	2.1	5.25:1
10	6x6x½ 13'0"	4' Leg-in	42	3.2	13.00:1
10	5x5x⅜ 15'0"	4'5" Leg-out	15	2.6	5.80:1
63	3½x3½x7/16 16'0"	5' Leg-out	30	8.6	3.50:1

BUFFALO FORGE COMPANY
446 Broadway, Buffalo, New York

Branch Engineering Offices in Principal Cities. In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

If you are interested in similar savings and in speeding production, it will pay you to get all the facts now on "Buffalo" Bending Rolls.

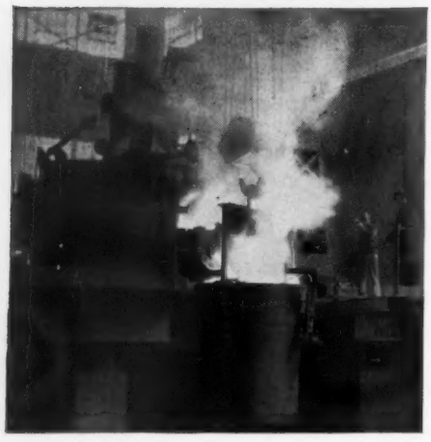


and 1000 tons for the Cincinnati Chemical Co. building at Cincinnati.

Chicago—Bids close this week on about 25,000 of structurals, piling and reinforcing bars for the Keystone dam in Nebraska and the Mississippi river dam at Cap au Gris, Mo. Awards continue light and private building activity in this district is slow to increase. Shape demand is aided by heavy requirements of railroads and equipment builders but production of fabricated material has expanded less than was anticipated.

BASIC ELECTRIC STEEL

FORGINGS



N.F.& O. Basic Electric Steel produced under rigid metallurgical control is an important *quality* factor in the ultimate forged product

BASIC ELECTRIC STEEL

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St. Louis—Large awards are still lacking, but there are several important projects in the offing and the outlook has improved over a month ago. Fabricating yards are operating at about half capacity, unchanged from last week.

San Francisco—Although fabricators are figuring on a number of projects calling for small lots, few new inquiries of size have developed. Bookings totaled 2432 tons and brought the aggregate for the year to 89,238 tons, compared with 61,934 tons last year. Consolidated Steel Corp. secured 450 tons for an office building in Culver City, Calif., for Metro-Goldwyn-Mayer. Bids have been taken on 850 tons for the Central Tower, San Francisco exposition.

Seattle—While fabricating plants have considerable work, no important new business has developed. Unstated tonnages are involved in a bulkhead gate, 16 gate frames and track assemblies for Coulee dam, bids to reclamation bureau, Denver, June 2.

Shape Contracts Placed

4100 tons, International bridge, American crossing, Thousand Islands bridge authority, Clayton, N. Y., to American Bridge Co., Pittsburgh.

780 tons, bridge, Westchester avenue, Bronx river, New York, to American Bridge Co., Pittsburgh; through Fred T. Ley Co., New York.

750 tons, train shed, Union Pacific railroad, Cheyenne, Wyo., to Omaha Steel Works, Omaha, Nebr.

725 tons, bridge, Central Railroad of New Jersey, Wilson avenue, Newark, to American Bridge Co., Pittsburgh; Standard Bitulithic Co., New York, general contractors.

560 tons, extension to Reed power station, for Duquesne Light Co., Pittsburgh, divided as follows. 260 tons to Pittsburgh-Des Moines Steel Co., Pittsburgh, and 300 tons to Bethlehem Steel Co., Bethlehem, Pa.

550 tons, senior high school, Scarsdale, N. Y. to Belmont Iron Works, New York; through William Berbusse Jr., New York, general contractor.

450 tons, office, Metro-Goldwyn-Mayer, Culver City, Calif., to Consolidated Steel Corp., Los Angeles.

426 tons, three story addition, Chrysler-DeSoto plant, Detroit, to R. C. Mahon Co., Detroit.

350 tons, three gates, Alcova dam, Specification 726, Wyo., to Commercial Iron Works, Portland, Oreg.

300 tons, bridges FAP 577-H and 577-I, Zapatta county, Texas, to Virginia Bridge Co., Roanoke, Va.

300 tons, bridge, Lehigh Valley railroad, Mendons, N. Y., to Phoenix Bridge Co., Phoenixville, Pa.

300 tons, electric railroad bridge, Los Angeles, to Wisconsin Bridge & Iron Co., Milwaukee.

290 tons, grade crossing, Lehigh Valley railroad, Ithaca, N. Y., to Harris Structural steel Co., New York.

270 tons, factory, Ohio Crankshaft Co., Cleveland, to Burger Iron Co., Akron, O.

270 tons, building No. 10, Calco Chemical Co., Bound Brook, N. J., to Savary & Glaeser Co., Dunnellon, N. J.

250 tons, buildings, Acme Steel Co., Riverdale, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

225 tons, one-story building, Textile Machine Works, Wytheville, Va., to Bristol Steel & Iron Works, Inc., Bristol, Va.

215 tons, addition, machine and finishing departments, Smith Paper Co., Lee, Mass., to Haarmann Steel Co., Holyoke, Mass.

210 tons, boiler works plant addition, St. Louis, to Superior Structural Steel Co., St. Louis.

200 tons, receiving building, Douglas Aircraft Co., Santa Monica, Calif., to Bethlehem Steel Co., Los Angeles.

200 tons, addition, Aviation Mfg. Co., Downey, Calif., to Soule Steel Co., Los Angeles.

200 tons, addition, National Biscuit Co., Marseilles, Ill., to Mississippi Valley Structural Steel Co., Chicago.

200 tons, bridge, Allen, Miss., to Vincennes Steel Corp., Vincennes, Ind.

195 tons, two power penstocks, Beverly, Tex., to Pittsburgh-Des Moines Steel Co. Pittsburgh.

175 tons, state bridge, Nantpicoke crossing, Broome county, New York to Bethlehem Steel Co., Bethlehem, Pa.; Davis & Stearns Inc., Whitesboro, N. Y. general contractor.

175 tons, warehouse alteration, Thirty-fifth street and Eleventh avenue, New York, to Post & McCord Co., New York; through Bernard J. Hughes Co., New York.

175 tons, Walker high school, Virginia, to Dietrich Bros., Baltimore.

175 tons, WPA project, Rochester, N. Y., to Genesee Bridge Co., Rochester.

165 tons, 50 muck cars, metropolitan water district, Los Angeles, to Pressed Steel Car Co., Pittsburgh.

160 tons, Pennsylvania state bridge for Bucks county at Bethlehem, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

155 tons, building, Maryland distillery, Relay, Md., to Acme Steel Co., Baltimore.

150 tons, tunnel ribs, metropolitan water district, Los Angeles, to Commercial Shearing & Stamping Co., Youngstown, O.

150 tons, building, Buffalo, to Ernst Iron Works, Buffalo; J. W. Cowper Co., Buffalo, general contractor.

150 tons, bridge in Lincoln county, Colorado, American Bridge Co., Pittsburgh.

140 tons, addition, Lockheed Aircraft Corp., Burbank, Calif., to Bethlehem Steel Co., Los Angeles.

140 tons, theater, Morristown, N. J., to Park City Iron Works, Newark, N. J.

135 tons, coaling station, Lincoln, Neb., to Lakeside Bridge & Iron Co., Milwaukee.

125 tons, gate counterweights, Alcova dam, Wyo., to American Bridge Co., Pittsburgh, Pa.

125 tons, bridge No. 1440, Harrison county, Indiana, to Midland Structural Steel Co., Cicero, Ill.

120 tons, bridge WPGM 628, Scranton, N. Dak., to Illinois Steel Bridge Co., Jacksonville, Ill.

115 tons, state highway bridge RC-2451, Jefferson county, New York, to McManus Steel Construction Co., Buffalo; Davis & Stearns Inc., Whitesboro, N. Y., general contractor.

100 tons, kitchen for veterans administration facility, Sawtelle, Calif., to Minneapolis-Moline Power Implement Co., Minneapolis.

Shape Contracts Pending

9400 tons, piling, dam and outlet conduits, Central Nebraska power and irrigation district, bids open May 21.

3700 tons, subway, section 6, route 101 West 8th to West 18th street, Sixth

avenue, New York; Spencer White & Prentis, Inc., low bids May 11 to Board of Transportation, New York.

2350 tons, building, Champion Paper & Fibre Co., Houston, Tex.

2350 tons, bridge, Jacksonville, Fla.

1840 tons, state highway bridge, Lehighton and Weissport boroughs, Carbon county, Pennsylvania; bids to state highway department, Harrisburg, Pa., May 28.

1700 tons, vocational high school, Toledo, O., J. H. Berkebile & Sons Co., Toledo, general contractor.

1100 tons, building, for Owens-Illinois Can Co., St. Louis.

1065 tons, state bridge, Merrimack river, Lowell, Mass.; Coleman Bros. Corp., Boston, low.

750 tons, piling, bulkhead, Jacob Riis park, Queens, N. Y.; A. M. Hazel, Inc., New York, low, bids May 12.

750 tons, transit shed, Long Beach, Calif.; Atlas Scraper & Engineering Co., Bell, Calif., low.

720 tons, state bridge, route 20, over Boston & Albany railroad and Westfield river, Huntington, Mass.; Arute Bros., Inc., New Britain, Conn., low, bids May 10.

511 tons, Sacramento river bridge, Red Bluff, Calif.; Moore Drydock Co., Oakland, Calif., low.

460 tons, state armory building, St. Louis.

450 tons, building, Ottawa, Ill., for Libbey-Owens-Ford Glass Co.

400 tons, State of Mo., including 200 tons for St. Louis County and 105 tons for Buchanan County; bids May 15.

372 tons, Big Horn river bridge, Big Horn county, Wyoming; bids May 18.

365 tons, pony truss bridge, Derry township, Westmoreland-Indiana counties, Pennsylvania; bids to state hignway department, Harrisburg, Pa., May 21. Included, 50 tons of plain steel bars.

350 tons, extension to boiler house, Rossford, O., for Libbey-Owens-Ford Glass Co.

350 tons, highway bridge, Long Island railroad, Glendale, N. Y.

275 tons, shapes and bars, state highway bridges, Ware river, Palmer, Mass.; Swift river, Ashfield, Mass., and Mill river, Hadley, Mass.; bids May 25, department of public works, Boston, G. H. Delano, chief engineer.

230 tons, federal post office building, Salina, Kans.

230 tons, office and store building, for Talbot Realty Corp., Dayton, O.

225 tons, bridge, Argyle, Wis.

200 tons, trash racks, Imperial dam, Potholes, Calif.; bids opened.

147 tons, crossing at Manderson, Big Horn county, Wyoming; bids May 18.

125 tons, two radial gates, Unity dam, Borgen, Oreg.; bids opened.

100 tons, plant extension, Ferro Enamel Corp., Cleveland.

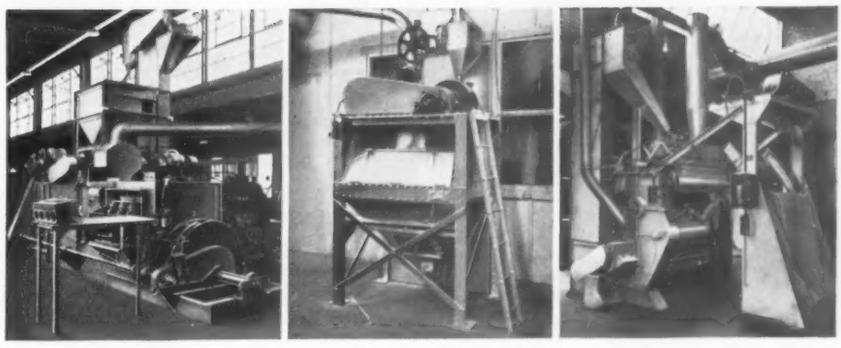
Unstated, gate, frames and assemblies for Coulee dam; bids to bureau of reclamation, Denver, June 2.

Unstated, state bridges and underpasses; bids in at Helena, Mont.

Cold-Finished

Cold Finished Prices, Page 89

Pittsburgh—While backlogs on cold-finished bars have been reduced recently, deliveries generally range around four to six weeks. Certain sizes of flats cannot be included in this range. Diversified consumers still are busy and are likely to reorder soon. Manufacturers of farm implements and ma-



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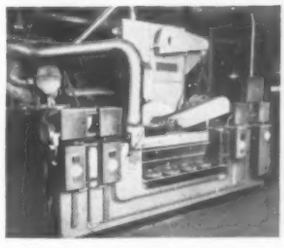

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chine tools have heavy orders facing them. Numerous bookings recently have come from the automobile industry. Cold-drawn carbon bars are quoted 2.90c, Pittsburgh.

Reinforcing

Reinforcing Bar Prices, Page 89

Pittsburgh—Awards were heavy last week, including 6000 tons for the Goldblatt stores and warehouse, Chicago, and 1500 tons for a reservoir at Sioux City, Iowa.

Cleveland — Reinforcing awards include numerous small jobs well under 100 tons, but no large project was reported. Mills are actively working off tonnage placed during the protection period. However, in most cases deliveries can be made inside of three weeks. Considerable tonnage is pending in the Industrial Rayon plant at Painesville, O., and Geo. Worthington Co. building at Cleveland, on which H. K. Ferguson Co., Cleveland, is general contractor.

Chicago — Shipments continue heavy but new business is insufficient to prevent some shrinkage in backlogs. Several large lots are pending, including about 4700 for the Keystone dam in Nebraska on which bids close May 21.

Boston—New business is coming out in greater tonnage, especially for bridges and highways. Awards include 220 tons for a sewer, Hartford, Conn. Prices are holding the recently developed strength, although scattered shading continues.

New York—Reinforcing bar buying has declined, although new tonnage, mostly for public work, is coming out in greater volume. Recent contracts are for smaller lots with prices, which recently firmed slightly, not subject to much test. Highway mesh for New York state work is much more active with openings May 18 and 25.

Philadelphia — Reinforcing bar buying continues spotty, with orders confined to small lots. Except for 670 tons of bars for the Howard street bridge in Baltimore, on which bids have just been opened, bar sellers see little outstanding in the way of new tonnage much before next month. Moreover, some of the state institutional work for which there is quite a program under contemplation may become active.

San Francisco—The most active market for the week was in reinforcing bars, and 2855 tons were booked, bringing the total for the year to 33,520 tons, compared with 86,082 tons a year ago. While inquiries for small lots continue unchecked, those for large tonnages are slow and mills are beginning to reduce backlogs.

Seattle — Under Interior department policy, award of 3000 tons for the Coulee and Roza projects, Washington state, went to the Carnegie-Illinois Steel Corp., shipment from Duluth, Minn. Bethlehem Steel Co. offered an identical bids, fabrication and shipment from Seattle. Local mills are cleaning up backlogs, but new business is not developing in volume. Prices are stable.

Concrete Awards Compared

	Tons
Week ended May 15	**17,769**
Week ended May 8	**5,751**
Week ended May 1	**4,672**
This week, 1936	**15,314**
Weekly average, 1936	**6,005**
Weekly average, 1937	**4,967**
Weekly average, April	**5,131**
Total to date, 1936	**144,510**
Total to date, 1937	**99,334**

Reinforcing Steel Awards

6000 tons, stores and warehouse, for Goldblatt Bros., Chicago, to Inland Steel Co., Chicago.

3000 tons, Coulee and Roza projects, Washington state, to Carnegie-Illinois Steel Corp., Pittsburgh.

1500 tons, reservoir, Sioux City, Iowa, to Sheffield Steel Corp., Kansas City,

1450 tons, bureau of reclamation, Odair, Wash., to Carnegie-Illinois Steel Corp., Duluth.

950 tons, Wesley Memorial hospital, Chicago, to Inland Steel Co., Chicago.

720 tons, sewer, Sioux City, Iowa, to Sheffield Steel Corp., Kansas City.

450 tons, Moody Bible institute, Chicago, to Inland Steel Co., Chicago.

450 tons, tobacco warehouse, for United Stores, Chicago, to Inland Steel Co., Chicago.

400 tons, postoffice, Waterloo, Iowa, to Inland Steel Co., Chicago.

400 tons, addition, for A. B. Dick & Co., Chicago, to Inland Steel Co., Chicago.

400 tons for Crown Can Co. building, St. Louis, Laclede Steel Co., St. Louis.

375 tons, foundation, Skagit No. 2 transmission line, Seattle, Wash., to unnamed interest.

220 tons, sewage project, contract 17, metropolitan district, Hartford, Conn., to Concrete Steel Co., New York; F. H. McGraw & Co., Hartford, general contractor.

200 tons, 5-story hospital addition, Indianapolis, Ind., to H. J. Baker & Co., Indianapolis; Service Construction Co., Indianapolis, general contractor.

200 tons, building, Benson & Rixon, Chicago, to Inland Steel Co., Chicago.

160 tons, bridge No. 3, Horace Harding boulevard, Long Island, N. Y., to Joseph T. Ryerson & Son Inc., Chicago.

135 tons, dam power house, Cumberland County Power & Light Co., Saco, Me., to Bancroft & Martin Rolling Mills Co., Portland, Me.; Ephriam E. Sanders, Inc., Portland, general contractor; 75 tons of structural steel pending.

130 tons, automotive vocational high school, Brooklyn, N. Y., to Joseph T. Ryerson & Son Inc., Chicago.

129 tons, four PWA jobs, Oakland, Calif., placed with Truscon Steel Co., San Francisco, by city.

100 tons, addition, men's dormitory, Ball State Teachers' College, Muncie, Ind., to H. J. Baker & Sons, Indianapolis; A. J. Glaser, Muncie, general contractor.

100 tons, machine shop and testing laboratory, San Pedro, Calif., to unnamed interest.

100 tons, kitchen for veterans administration facility, Sawtelle, Calif., to unnamed interest.

100 tons, alterations to Fremont high

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school, Los Angeles, to unnamed interest.

100 tons, office for Metro-Goldwyn-Mayer, Culver City, Calif., to unnamed interest.

Reinforcing Steel Pending

4700 tons, dam and outlet conduits, Central Nebraska power and irrigation district, bids open May 21.

380 tons, bridge, Lehighton and Weissport boroughs, Carbon county, Pennsylvania; bids to state highway department, Harrisburg, Pa., May 28.

375 tons, subway, section 6, route 101, Sixth avenue, New York from West Ninth to West Eighteenth street, Manhattan.

317 tons, three state highway projects; bids to Idaho highway department, at Boise May 21.

300 tons, building, Geo. Worthington Co., Cleveland, H. K. Furgerson Co., Cleveland, general contractor.

275 tons stop log and equipment for Bonneville dam; bids to U. S. Engineer, Portland, June 1. Also 35 tons of shapes.

250 tons, viaduct, 103rd street, Chicago, bids soon.

200 tons, bars and shapes, recreation building No. 210, veterans' hospital, Togus, Me.

140 tons, bureau of reclamation, invitation 21,041-A, Fall Siding, Idaho; bids opened.

130 tons, bureau of reclamation, invitation 27,037-A, Fresno, Mont.; bids opened.

130 tons, bridge, Long Island railroad, Glendale, N. Y.

125 tons, bureau of reclamation, invitation A-22,019-A, Casper, Wyo.; bids opened.

115 tons, three bridges in Larimer and Big Horn county, Wyoming; bids May 18.

Unstated, four underpass and bridge contracts; bids in at Helena, to Montana highway department.

Metallurgical Coke

Coke Prices, Page 89

While spot coke demand is lighter, prices have held up well except in domestic fuel, which has entered its quiet season. Some independent coal operators in the district have cut their weekly operating schedule, but most coke plants continue to operate five days a week. Bethlehem Steel Co. resumed movement on its contract after a few days' suspension. According to the United States bureau of mines, output of beehive coke for the calendar year through May 1 was 1,231,900 net tons, compared to 487,700 net tons in the comparable period of 1936.

With foundry operations steady, shipments of by-product foundry coke are holding near the rate of the past 30 days. A heavy movement is in prospect during the balance of the quarter.

Pig Iron

Pig Iron Prices, Page 90

Pittsburgh—Spot business continues light, but shipments have held up fairly well recently. Export inquiries are lighter. No announcement has been made yet on third-quarter prices and many consumers anticipate no change.

Cleveland—Spot business is negligible as speculation over third quarter business has declined. Shipments continue heavy, reflecting continued good schedules among most foundries. To many the possibility of a third quarter price increase hinges on the trend of foreign demand, and their willingness to pay premiums.

Chicago—Pig iron shipments are steady, comparing favorably with rate a month ago. Consumption generally is well sustained but foundries are covered by previous commitments and are making few new

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purchases. Market is steady on spot business at $24, furnace, for No. 2 foundry and malleable. Third quarter market has yet to be announced.

Boston—Shipments against second quarter pig iron orders are steady with fair volume of scattered small-lot spot buying. Substantial export inquiry continues with premium prices offered. Recent foreign volume includes 1100 tons to Sweden. Close to 10,000 tons, volume previously booked, has moved into New England through Beacon, N. Y., since the barge canal opened.

New York—Reaffirmation of current prices on pig iron for third quarter is now regarded as likely in most trade quarters. Meanwhile specifications are moving heavily against contracts, with new buying irregular. It is reported here that a southern furnace recently booked 50,000 tons for Japan, part of the 100,000 tons reported earlier in the month as having been distributed among several sellers.

Buffalo—Shipment of upwards of 3000 tons of Buffalo pig iron for export was reported here today. The movement of this iron may be a forerunner of much additional export business placed with local merchants, it was said. Shippers refused to disclose the destination of the tonnage. Domestic consumption continues to broaden and shipments are greatly in excess of the forecasts of producers. Rogers Brown's idle furnace will again be in operation before Memorial Day, it is expected. Meantime 11 furnaces are blowing here.

Philadelphia—As time approaches for opening books for third quarter, trade opinion appears to lean more decidedly to the belief that there will be no advance. However, considerable speculation still exists. Meanwhile, new buying continues spotty, with heavy specifications moving against contracts.

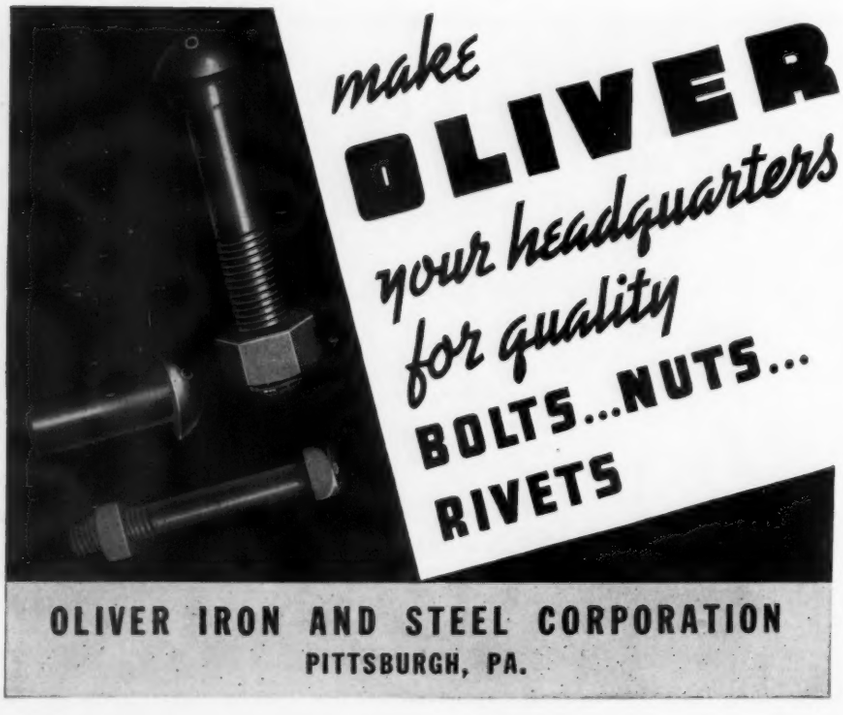
Cincinnati—The pig iron market remains dull, new business this quarter having been light, on account of heavy stocks and delayed deliveries against contracts. Announcement of third quarter prices, furnace interests believe, will bring activity. Spot shipments for fill-in purposes are slightly better. Foundry melt is heavy.

St. Louis—With buying of pig iron virtually at a standstill, sellers are chiefly engaged in shipments. The movement this month is about on a parity with April.

The melt is strong, with mills and foundries operating equal to the best of the recovery period.

Birmingham, Ala.—Pig iron market continues strong and production heavy. Gadsden blast furnace, down for past several years under Gulf States Steel Co., has been blown in by Republic Steel Corp. No. 1 furnace of Sloss-Sheffield Steel & Iron Co. is being relined. No. 1 furnace of Woodward Iron Co. has been repaired. District has 14 furnaces in blast.

Toronto, Ont.—Merchant pig iron sales continue steady. Prices are firm and local blast furnace representatives do not look for changes soon. Melters are entering market regularly for spot needs and awards are holding around 1700 tons per week. Individual orders range from a car to 500 tons and while no forward delivery contracts were reported for the week, some melters are taking in supplies to carry them through this quarter.



Scrap

Scrap Prices, Page 92

Pittsburgh—Scrap was inactive last week, with the range on No. 1 heavy melting steel holding at $19.50 to $20 per ton. Up to midweek, the whole district was operating at an unusually high rate, but the labor situation which developed created uncertainties among dealers and buyers. The leading interest, having been out of the market for some time, was considered likely to pick up tonnages.

Cleveland—Purchases of iron and steel scrap are at a minimum and new buying is confined largely to miscellaneous grades. Important buyers are placing no new business and are restricting shipments. Some "distress" scrap is appearing. While some grades are not quotably changed, others are off 50 cents to $1.50 a ton.

Chicago—Scrap prices continue easy and a number of grades are down 50 cents to $1 a ton. Heavy melting steel has been sold in small lots at $17.50. Sellers find it unnecessary to bid actively for scrap since offerings continue fairly plentiful. The absence of an extensive short interest, and lack of heavy buying by consumers, contribute to an easy price situation.

Boston—Scrap prices for dock delivery are steady. Boat loading continues active, but domestic demand is light with prices on several grades easy. For borings and turnings $9, f.o.b., for tonnage has been bid.

New York—Heavy melting steel for domestic shipment is off $1, brokers paying $15 to $15.50 with No. 2 down a similar amount. Other grades are weaker, including heavy breakable cast, grate bars, stove plate and machine turnings. Prices for export are unchanged.

Philadelphia—Further reductions are noted in numerous grades of scrap, including notably changes in heavy melting steel, stove plate, railroad grate bars and new compressed sheets. One leading purchaser early last week picked up

some fair tonnages from outside the immediate territory at as low as $17.50, delivered, Bethlehem and Steelton, Pa. There has been increasing resistance, however, to lower prices and generally speaking the market on No. 1 steel is now nearer $18 to $18.50, delivered, with No. 2 steel at $16.50 to $17. Contributing to the continued easy tone in steel scrap is the withdrawal of dealer offerings for export in this district, these buyers having apparently covered sufficiently to meet nearby boat schedules.

Buffalo—A good portion of railroad lists which closed this month came to Buffalo and vicinity, dealers report. They say $20.50 to $21, delivered to local mills, was paid for tonnage. This is at least $1 in excess of the best bid of consumers for material from Buffalo yards. Dealers feel the local offers are nominal and that an actual market may be established shortly.

Detroit—Weakness in scrap continues, as buyers remain out of the trade, except for small commitments. Prices have eased further, with compressed sheets now down 75 cents to $16.50-$17 and loose clippings off 50 cents to $11.50-$12. Machine turnings also are off sharply, at $10-$10.50.

Cincinnati—Dealer bids for iron and steel scrap are off 50 cents from the preceding week, and the market continues soft. With mills out of the market, an occasional lot of scrap is available below quotations. Holding a bearish sentiment, dealers shun heavy additions to yard stocks, and even covering on contracts is not aggressive.

St. Louis—Lack of interest by melters, more abundant offerings of certain grades and continuance of congestion at some plants, have resulted in further weakening in scrap iron and steel.

Shipments continue in volume and consumption has not receded from recent levels, but temporary conditions favor buyers, and there is no indication of change.

Toronto, Ont. — Iron and steel scrap markets have developed little change. Supplies are being depleted and new supplies are well under requirements. There has been some improvement in deliveries of iron grades from rural districts recently.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 89

Bolt, nut and rivet prices for third quarter are not expected to be announced before next month. In view of the fact that raw material costs have increased more sharply than have bolt, nut and rivet prices, some consideration has been given to an increase in quotations on the latter. Shipments continue heavy and while new business is relatively quiet, producers anticipate a maintenance of active deliveries during the remainder of this quarter. Active operations continue among leading consumers, particularly among freight car, farm implement, and tractor builders.

A leading distributor of bolts and nuts in Cleveland has announced some adjustments in semifinished hexagon nuts: ½ to 7/16-inch are now quoted 60-10 off; ½ to 1-inch 60-5 off; over 1-inch 60 off. These adjustments are for third quarter and represent an advance of 10 points on the average. Small rivets, 7/16-inch and smaller are now quoted 65-5 off. Further adjustment is expected in bolts and large rivets are expected later this month.

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Warehouse

Warehouse Prices, Page 91

Cleveland—Actual volume of individual orders received by warehouse distributors has shown little change, but the aggregate tonnage involved has declined considerably.

Chicago—While moderate decrease is noted from the peak volume of earlier months, let-down is less than usual for this period. Marked gains continue to be shown over rate of a year ago.

Philadelphia—A moderate let-down is noted in jobbing demand, particularly in sheets, a situation which reflects improved mill deliveries and also somewhat lighter consuming requirements. However, business is still brisk and some leading distributors look for the month to show no pronounced drop in volume. Prices are steady.

Cincinnati—Sales of steel from warehouse show no decline. Delayed mill deliveries continue to account for considerable tonnage, although jobbers are replenishing stocks with more facility than in recent months. Prices are firm.

St. Louis—Distributors report no appearance of the usual recession usual in early May. Shipments are holding up extremely well, and the demand is well diversified.

Ferroalloys

Ferroalloy Prices, Page 90

New York—Ferromanganese consumers under contract and hence still under protection at old prices are specifying heavily, particularly with consumption large and prospects for continued good consumption well into third quarter. The spot market continues at $102.50, duty paid, Atlantic seaboard. Domestic spiegeleisen, 19 to 21 per cent, for spot is $33, Palmerton, Pa., but with most tonnage moving under contract at $30.

Steel In Europe

Foreign Steel Prices, Page 91

London—(*By Radio*)—Continued high production of steel ingots in Great Britain is being maintained, total for April being 1,080,400 gross tons, which is only 29,100 tons less than the alltime high of 1,109,500 tons made in March. With one less day in April this slight decline is nominal. Pig iron output in April was 680,700 tons, compared with 680,300 tons in March. Active stacks at the end of April numbered 121, compared with 117 at the end of March.

Pig iron producers are sold for months ahead and prices of foundry iron are expected to be advanced, at least 20s per ton. Steelworks are unable to keep pace with orders, even at the new level of prices. The position in semifinished steel is easier, owing to increased domestic output.

The Continent reports export trade continues active with premiums up to 50s, gold, offered for deliveries in five months. Sheet prices have been officially increased £1.

Iron Ore

Iron Ore Prices, Page 92

Cleveland—Although April shipments of iron ore from the upper lakes, 3,770,555 tons, established a new record for the month, stocks at Lake Erie ports were reduced by more than 500,000 tons. Receipts of iron ore at lower lake ports during April, shipments to interior furnaces, and dock balances follow:

	Receipts	Shipments	Dock bal. May 1,'37
Buffalo	210,700	77,582	937
Erie	105,789	106,662	42,715
Conneaut	421,170	577,510	1,064,681
Ashtabula	299,495	518,227	502,916
Fairport	62,682	149,312	305,307
Cleveland	405,087	455,507	194,189
Lorain	173,294	73,711	3,871
Huron	83,412	86,877	189,490
Toledo	68,132	24,441	32,547
Total	1,829,761	2,069,829	2,336,653
Year ago		556,761	4,129,948

Receipts at other than Lake Erie ports for April follow:

	April receipts
Detroit	66,014
Indiana Harbor	105,383
Gary	242,184
South Chicago (local fces.)	307,514
Sault Ste. Marie, Ont.	23,886
Hamilton, Ont.	24,970
Total	769,951
Year ago	8,955

The Cleveland Cliffs Iron Co., Cleveland, chartered the steamer NEPTUNE with capacity of 5300 tons, from Dolores Steamship Co., Buffalo, for the ore and coal trade. The NEPTUNE formerly was in the Interlake Steamship Co. fleet.

Tin Plate

Tin Plate Prices, Page 88

Pittsburgh—Up to the middle of last week, tin plate operations were over 100 per cent, with most mills working extra turns, all well sold out until Sept. 30 and encountering pressure for shipments. Apparently most of the material being shipped is going into immediate use and consumers have little chance to accumulate stock.

New York—Tin plate consumers are specifying to the full extent of contracts. Threat of labor trouble may have added somewhat to interest of consumers in obtaining specifications but with a better outlook there is still strong demand, indicating not only heavy consumption requirements but desire to obtain as much tonnage as possible before Sept. 30 when protections expire.

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Nonferrous Metals

Nonferrous Metal Prices, Page 90

New York—Release of the bullish copper statistical report, showing a drop during April of 25,068 tons in world refined stocks, was the outstanding development in nonferrous metal markets last week. Foreign markets were dull due to holidays in London with the price tone easy. Domestic markets held generally unchanged.

Copper — World stocks of refined copper at the end of April totaled only 283,363 tons, a new low for recent years, of which 99,576 tons were in this country and 183,787 in foreign countries. World production of blister copper increased 11,357 tons to 215,740 while refined output held steady at 191,891 tons. World apparent consumption increased 6135 tons to a total of 216,877. Sellers are encountering difficulties in making deliveries due to limited spot supplies. Sales maintained a steady pace at slightly over 1500 tons per market day and on the unchanged basis of 14.00c, Connecticut, for electrolytic. Export copper was softer at around 14.20c, c.i.f.. European ports. Brass ingot prices declined due to the heavy flow of copper and brass scrap at lower prices.

Lead — Buying tapered last week although total turnover was satisfactory. Undertone of the market held steady at 5.85c, East St. Louis.

Zinc—Prime western held firm at 6.75c, East St. Louis, despite light demand. Sellers have welcomed the prolonged quiet period in view of their well sold position. Consumption continues heavy while stocks are still extremely tight.

Tin—Prices held fairly steady at levels below those prevailing earlier in the month. Consumers continued to show little buying interest. Straits spot closed around 54.62½c.

Antimony — American spot dropped ⅞-cent to 14.50c, New York, on lower quotations abroad and light demand. Chinese spot eased 1-cent to 16.00c, duty paid, New York.

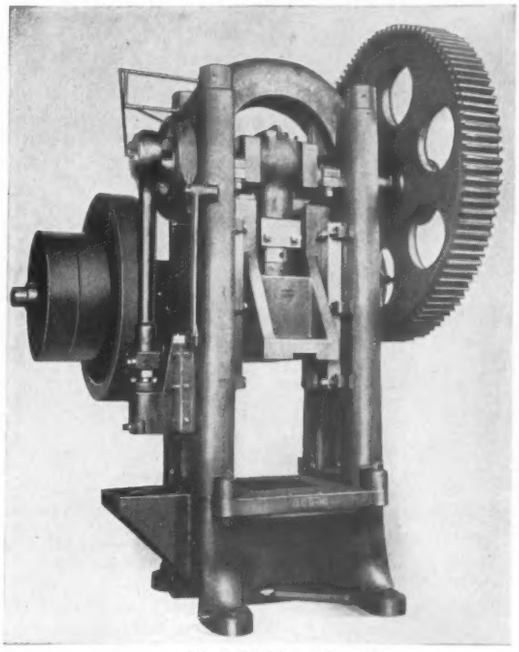
Triple Supply Convention Sees Prosperity Returning

(*Concluded from Page* 19)

Robins Jr., Hewitt Rubber Corp., Buffalo.

National Supply and Machinery Distributors' association elected officers as follows: President, Russell C. Duncan, R. C. Duncan Co., Minneapolis; first vice president, W. T. Ryan, Cutter, Wood & Sanderson Co., Cambridge, Mass.; second vice president, Charles E. Curtis, Western Iron Stores Co., Milwaukee. George A. Fernley and H. R. Rinehart, Philadelphia, continue, respectively, advisory secretary and secretary-treasurer. New members of the executive committee are F. Marsena Butts, Butts & Ordway Co., Boston, and H. E. Howard, Ducommun Metals & Supply Co., Los Angeles. A. R. Smith, Boyer-Campbell Co., Detroit, was re-elected to the executive committee.

Southern Supply and Machinery Distributors' association elected the following officers: President, Robert S. Page, Henry Walke Co., Norfolk, Va.; first vice president, Jack B. Dale, Briggs-Weaver Machinery Co., Dallas, Tex.; second vice president, Edward F. Stauss, Oliver H. Van Horn Co. Inc., New Orleans. Alvan M. Smith, Smith-Courtney Co., Richmond, Va., who occupied the post of president for two days following the resignation of C. A. Dillon, Dillon Supply Co., Raleigh, N. C., continues as secretary-treas-



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urer. Mr. Dillon was elected chairman of the executive committee. New members are J. B. Crimmins, Mills & Lupton Supply Co., Chattanooga, Tenn., and J. M. Bates, Moore-Handley Hardware Co., Birmingham, Ala.

New Power Cable Prices By General Electric

General Electric Co., Schenectady, N. Y., has revised its price book on rubber power cables and has released new data to its district offices as of May 8. These new prices represent a general readjustment in list prices and will be effective May 24.

Semifinished

Semifinished Prices, Page 89

Pittsburgh—With tin plate and sheet manufacturers exerting pressure for sheet bars, and demand for wire rods holding up well, specifications for semifinished have shown no decrease. Production was at an unusually high mark. The outlook for a continued high rate of demand is good. Tube round and skelp specifications are well maintained. Although export inquiry has lessened slightly, this is partly due to difficulty in obtaining bottoms. Billets and blooms, sheet bars, and slabs are quoted $37 per gross ton, Pittsburgh, forging billets, $43; skelp, 2.10c, and wire rods, $47 and $52.

Equipment

New York—While machine tool builders, operating at capacity, have generally increased shipments, incoming orders continue heavy, maintaining backlogs. General Motors has bought heavily for the Chevrolet plant at Buffalo, purchases being widely distributed. Many builders are not promising delivery on current buying before December.

Boston—Some machine tool dealers note slight drop in new buying. However, incoming business on the whole is heavy and backlogs substantial. Deliveries are further extended on some lines. Despite inability of some shops, building heavier types of equipment, to ship before late fall, there are no cancellation reports. Not only is demand strong for all types of metal working tools, but builders of textile, paper mill and other industrial plant equipment are rushed.

Chicago—Machine tool and equipment markets are somewhat less active, but comparison is with recent unusual briskness. Machine tool inquiries are lighter, the lag being ascribed to heavy buying before price increases. With heavy backlogs, tool builders are given little concern by opposition to latest price advances. Order books have been reduced but little though deliveries have been shortened by heavier output.

Construction and Enterprise

Connecticut

BRIDGEPORT, CONN.—General Electric Co., Schenectady, N. Y., has announced extensive power house modernization program to cost over $1,000,000. S. Stewart Clark is works manager at Bridgeport.

BRIDGEPORT, CONN.—Bead Chain Mfg. Co., Mountain Grove street, plans construction of plant addition at an estimated cost of $100,000. Aberthaw Co., 80 Federal street, Boston, is general contractor.

DERBY, CONN.—Hershey Metal Products Co., maker of screw machine products, has awarded contract to Eastern Construction Co., 149 Temple street, New Haven, Conn., for plant addition estimated to cost $40,000 with equipment.

Massachusetts

MARLBORO, MASS. — Marlboro Wire Goods Co. is asking bids for three-story factory addition, 70 x 160 feet, to cost about $60,000 with equipment. O. E. Nault & Sons, 48 Hamilton street, Worcester, Mass., are architects.

SPRINGFIELD, MASS. — Commanding officer, ordnance department, Springfield armory, asks bids, due May 21, for five hand milling machines and attachments, circular 221.

WORCESTER, MASS.—Norton Co., manufacturer of abrasives, plans construction of $300,000 building, 100 x 300 feet, to house grinding wheel finishing department at its Worcester plant.

New York

COBLESKILL, N. Y.—Harder Refrigerator Corp., manufacturer of refrigerating equipment and parts, plans construction of three-story and basement addition to cost over $60,000 with equipment. Alexander Selkirk, 11 North Pearl street, Albany, N. Y., is architect.

LOCKPORT, N. Y.—Harrison Radiator Division, General Motors Corp., Flint, Mich., has announced plans for construction of $500,000 unit, here, to manufacture thermostats, car heaters, etc. Frank M. Hardiman is general manager.

ROCHESTER, N. Y.—Consolidated Machine Tool Corp. of America Inc., 565 Blossom road, has awarded contract for construction of factory addition, one-story and basement, 150 x 200 feet, to cost over $80,000. John B. Pike & Son Inc., 1 Circle street, has contract. J. F. Ancona, 311 Alexander street, is engineer.

GOUVERNEUR, N. Y.—Rushmore Paper Mill factory at Natural Dam was severely damaged by fire recently.

Pennsylvania

PHILADELPHIA — Penn Pipe Hanger Co., 1315 Wood street, is in the market for a combination power punch and shear (No. 55 Beloit or equal).

STATE COLLEGE, PA.—Borough is taking bids, due May 20, for furnishing necessary materials and equipment to construct activated sludge sewage disposal plant.

Ohio

CANTON, O.—Barium Steel Corp. plans construction of plant improvements, including installation of annealing and pickling units, roughing and finishing cold-rolling units, 24-inch cold strip mill and additional cutting and laboratory equipment. J. A. Sisto is president.

CLEVELAND — George Worthington Co., 802 St. Clair avenue, plans immediate expansion of plant facilities, including two buildings, one five-story, 100 x 120 feet, the other four-story, 25 x 60 feet, between St. Clair and Johnson avenues, to provide additional warehouse space. Equipment will include two elevators. Cost is estimated at $250,000. H. K. Ferguson Co., Hanna building, is contractor.

CLEVELAND — Addressograph-Multigraph Corp., 1200 Babbitt road, plans construction of factory addition on its 30-acre tract in Euclid. Cost, including tools and equipment, is estimated at $1,130,000. Joseph E. Rogers is president.

DAYTON, O.—Office of contracting officer, materiel division, Wright field, is taking bids until May 19 for one combination shear, punch and coper machine, circular 37-721, for delivery Wright field; until May 21 for various quantities and sizes of mild carbon sheet steel, circular 37-710, for delivery various air depots: until May 27 for one band saw, one wood shaper, one sander and one planer-jointer, all motor-driven, circular 37-700, for delivery f.o.b. contractor's plant; for miscellaneous universal, horizontal and vertical milling machines, circular 37-701, for delivery f.o.b. contractor's plant; and until May 28 for two pedestal type disk grinders and two portable, flexible shaft grinders, circular 37-679 (amended).

MARTINS FERRY, O.—Wheeling Steel Corp., Wheeling, W. Va., plans construction of galvanizing unit at its plant here. Extensions and improvements are also to be made at power house, including boilers and auxiliary equipment.

MT. GILEAD, O.—Morrow County Rural Electric Co-operative Inc., D. R. Stanfield, manager, care Ohio Farm Bureau, Pure Oil building, Columbus, is taking bids at Columbus, due May 21, for construction of rural electric transmission lines. Carl Frye, Pure Oil building, Columbus, is engineer.

READING, O.—City is making plans for extensions to facilities of municipal light and water plant, including turbine installation and erection of two smokestacks. Cost is estimated at $82,000. Fund of $60,000 is available. Phil Bok is service director; Clarence Hammel is city engineer.

WARREN, O.—Packard Electric divi-

(Please turn to Page 110)

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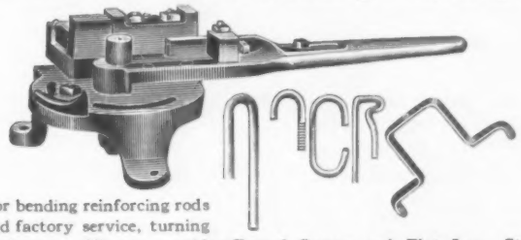

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(*Continued from Page* 108)

sion General Motors Corp., has announced expansion program for plant, here, with estimated expenditure of $400,000. B. M. McGregor is general manager.

District of Columbia

WASHINGTON — Procurement division, treasury department, Seventh and D streets S. W., will take bids until June 20 for one nine-inch motor-driven workshop lathe with chuck and tool assortment, invitation 8888-SP-6-1, for delivery Miami Beach, Fla.; and for saw, band saw, jointer, planer and lathe with accessories, invitation 8873-SP-6-1, for delivery Washington.

WASHINGTON—Bureau of supplies and accounts, navy department, is taking bids until May 21 for one electric arc-welding set, schedule 668, for delivery Brooklyn, N. Y.; one motor-driven dowel machine, schedule 677, for delivery Boston; one high speed radial drill press, schedule 678, for delivery Philadelphia; miscellaneous centrifugal pumps, schedule 679, for delivery various east coast points; miscellaneous horizontal and universal milling machines, schedule 700, for delivery Philadelphia; 18 tons nickel bar steel, schedule 703, for delivery Boston; until May 25 for one box-type electric furnace, schedule 663 for delivery various east or west coast points; one bolt pointing and threading machine, schedule 670, for delivery Mare Island, Calif.; miscellaneous light-duty engine lathes, schedule 674, for delivery San Diego and Mare Island, Calif.; one motor-driven wire straightener and cutting machine, schedule 684, for delivery San Diego; one automatic screw machine, schedule 686, for delivery San Diego; two precision lathes, schedule 691, also for delivery San Diego; one upright drill press, schedule 708, for delivery Mare Island; two universal turret lathes, schedule 721, for delivery Brooklyn; two motor-driven metal shapers, schedule 722, for delivery Boston; and until May 28 for one upright drill press, schedule 695, for delivery various east or west coast points; one pedestal type heavy-duty grinding machine, schedule 697, for delivery various east or west coast points; and one motor-driven toolroom lathe, schedule 699, for delivery various east or west coast points.

Georgia

ATLANTA, GA.—Sloan Paper Co., 543 Whitehall street N. W., has acquired site on Fair and Castleberry streets and plans to erect one-story warehouse building. J. R. Dillon and E. S. Lewis, Grant building, are architects.

ATLANTA, GA.—Cluett-Peabody, 1822 Murphy avenue S. W., has plans prepared by Robert & Co., engineers, Bona Allen building, for construction of factory addition, 130 x 255 feet. Will receive bids May 18.

AUGUSTA, GA.—City will vote June 2 on issuing about $500,000 waterworks and sewer system bonds. Richard E. Allen Jr. is mayor.

Louisiana

LAKE CHARLES, LA.—City will vote June 8 on bond issue of $160,000 to finance construction of sewage disposal plant. J. M. Fourmy, Hammond, La., is engineer.

Mississippi

OXFORD, MISS.—City receives bids until May 27 for construction of building addition to power plant and for furnishing certain electrical machinery and supplies. W. T. Chandler is city clerk.

Tennessee

MEMPHIS, TENN. — Alumina Silicates Corp., Cotton Exchange building, has acquired factory buildings and site of former Memphis Milling Co., 2087 Chelsea street, for conversion into manufacturing unit of Heatmaster insulation division. Expenditure for improvements will be about $15,000.

Virginia

MARION, VA.—City is considering construction of sewer system at a cost of $175,000. J. B. McCrary Co., 204 Rosenburg building, Roanoke, Va., engineer, has been authorized to apply for federal funds to finance project.

NORFOLK, VA. — Henry Walke Co. is in the market for lathe, drill press (up to 1½ inches), shaper, hack saw, bolt threading machine, grinder wheel and small hydraulic press (about 60 tons).

RADFORD, VA. — Burlington Mills Corp., Jefferson building, Greensboro, N. C., will erect silk mill to manufacture dress goods on 11-acre site, here, according to city manager, H. T. Roberts.

WYTHEVILLE, VA.—R. P. Johnson is in the market for a used six-foot band saw mill.

Texas

BEAUMONT, TEX.—Port commission has application before PWA for funds to erect shipside warehouse, oil dock and purchase equipment, including two locomotive cranes, electric lift magnets, motor generators, etc. Cost of construction is estimated at $300,000; of equipment, $70,000. O. L. Caywood is port director.

CORPUS CHRISTI, TEX. — Nueces county navigation district No. 1 is having plans completed for construction of wharf and commodity warehouse estimated to cost about $300,000. Robert J. Cummins, Banker's Mortgage building, Houston, Tex., is engineer.

DEPORT, TEX.—City receives bids May 21 for construction of waterworks improvements. J. R. Hutchinson is mayor; Hawley, Freese & Nichols, Capps building, Fort Worth, Tex., are engineers.

DONNA, TEX.—Donna Fruit Co. plans to double capacity of plant by installation of steam power and equipment estimated to cost $12,000.

GANADO, TEX.—City commission receives bids May 24 for construction of water supply and sewage disposal facilities, including deep well, turbine pump, piping, 50,000-gallon elevated steel tank and tower, sewage collecting system and disposal equipment. Roy Selby is mayor; M. C. St. John, 323 Mason building, Houston, Tex., is engineer.

ITASCA, TEX.—Hill County Electric Co. receives bids May 25 for construction of rural electric distribution system, 311 miles, in Hill, Ellis and Johnson counties. William G. Morrison, 204 Professional building, Waco, Tex., is engineer.

MERCEDES, TEX.—Willacy and Hidalgo counties water control and improvements district No. 1, 204 East Hidalgo street, Raymondville, Tex., receives bids about June 15 for construction of pumping plant on river south of here at an estimated cost of $425,000. Plans will be completed about May 27. W. E. Anderson, 218 South Sam Houston street, San Benito, Tex., is engineer.

RIO GRANDE, TEX.—Phoenix Refining Co., 4601 Somerset road, San Antonio, Tex., is considering erection of oil refinery near here, including steel tank storage and distributing facilities, boiler plant, pumping station and other mechanical departments. Total cost would be about $200,000.

Wisconsin

MILWAUKEE — Northland Mfg. Co. has been incorporated by Aage Jensen and associates, to manufacture windshield heaters and other specialties. Capitalization is $25,000.

MILWAUKEE — International Harvester Co., Harrison and Michigan avenues, Chicago, Ill., is enlarging foundry at Milwaukee tractor and cream separator plant by construction of building addition, 25 x 70 feet.

WEST ALLIS, WIS. — Board of vocational education closes bids May 20 for furnishing machinery equipment for $75,000 addition to vocational institute. H. S. Belman is director.

Kansas

EUREKA, KANS.—City plans construction of waterworks system, including wash water tank, filter, well, pumps, mains, etc., at an estimated cost of about $90,000. Paulette & Wilson, 311 Farmer's Union building, Salina, Kans., are consulting engineers.

NORTON, KANS.—State board of administration has applied to WPA for $190,000 grant to finance construction of sewage disposal plant and hospital building at the tuberculosis sanitarium. Cost will be about $420,000. Paulette & Wilson, 311 Farmer's Union building, Salina, Kans., are consulting engineers.

North Dakota

KINDRED, N. DAK.—Southern Cass county electric co-operative has been allotted an additional $185,000 by REA for construction of 429 miles rural transmission lines. Total cost of project will be $440,000.

WALHALLA, N. DAK.—City will hold special election soon on $58,000 bond issue for construction of municipal light and power plant. E. L. Lium, Grand Forks, N. Dak., is engineer.

South Dakota

DUPREE, S. DAK.—City will vote soon on issuing $25,000 bonds toward construction of $60,000 water and sewer system, including 50,000-gallon water tank.

FREEMAN, S. DAK.—City will hold special election soon to vote on construction of municipal power plant and distribution system, to cost $72,000. Buell & Winter Engineering Co., 508 Insurance Exchange building, Sioux City, Iowa, is consulting engineer.

PARKER, S. DAK.—City voted in favor of bond issue to finance construction of $44,000 municipal electric light and power plant. Elsie Benney is city auditor.

SANATOR, S. DAK.—State Board of charities and corrections has filed application with PWA for funds to finance purchase and installation of electric generator at state sanatorium, to cost about $30,000. Legislature recently appropriated $15,000. Charles Trimmer, Madison, S. Dak., is consulting engineer.

Iowa

ARNOLD'S PARK, IOWA—State senate

(*Please turn to Page* 112)

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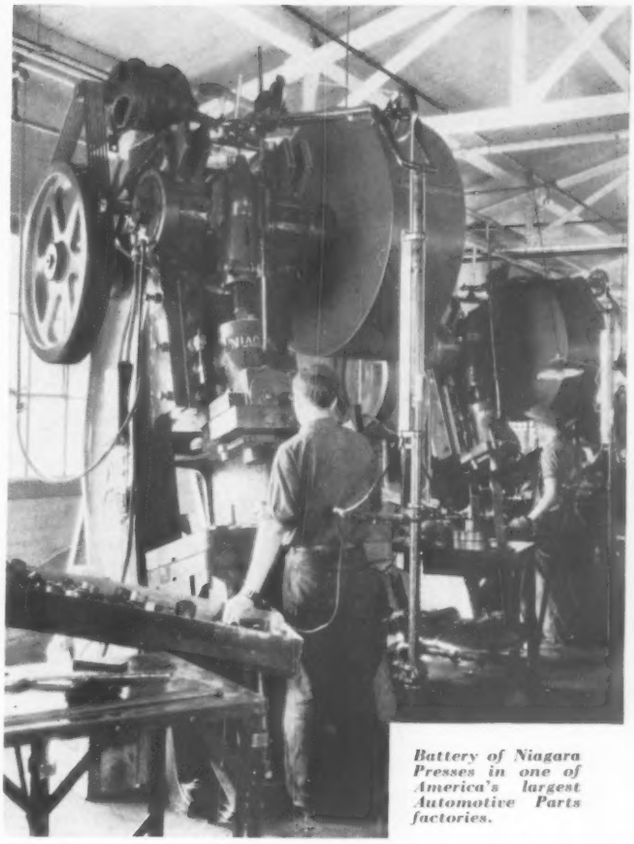

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(Concluded from Page 110)

voted to authorize use of $125,000 toward construction of sewage disposal plant estimated to cost $500,000. Howard R. Breen Co., 417 First avenue, Cedar Rapids, Iowa, is consulting engineer. Federal project.

ALTA VISTA, IOWA—City is making survey as to the possibilities of constructing sewage disposal plant. George Lofy is city clerk.

BELLEVUE, IOWA—City is taking bids, due May 28, for one 500-horsepower diesel engine, with switchboard, generator, panel, piping and wiring, foundation for engine and remodeling of building. Lester J. Gaylord is city clerk.

DES MOINES, IOWA — Roto-Rooter Corp., manufacturer of sewer cleaning machinery, has moved to new factory quarters at 2300 University avenue where it has acquired larger manufacturing facilities. S. O. Blank is president of the company.

GRUNDY CENTER, IOWA — Marshall Canning Co. plans additions and improvements to canning factory estimated to cost about $30,000.

MASON CITY, IOWA — John Deere Plow Co., Moline, Ill., has awarded contract for construction of two-story distribution plant and warehouse, 100 x 200 feet, and a loading dock, 70 x 120 feet, to cost about $80,000.

MUSCATINE, IOWA—Iowa Electric & Power Co. has applied to board of railroad commissioners for permission to construct electric transmission lines estimated to cost about $16,000.

NEW HAMPTON, IOWA—City is making preliminary survey to obtain estimates of cost of construction of sewage disposal plant. E. G. Fiala, state board of public health, Ames, Iowa, has outlined plans for the work. Carl A. White is mayor.

OAKLAND, IOWA — Northern Natural Gas Co. has started construction of $250,000 compressor station, in which will be installed two 1000-horsepower compressor units. The main structure will be 100 feet square, with an auxiliary building, 100 x 75 feet.

TIPTON, IOWA—Cedar county rural electric co-operative has plans approved by railroad commissioners for construction of 680 miles of 6900-volt lines and 10 miles of 12,000-volt lines at an estimated cost of about $700,000.

TRAER, IOWA—Petition is being circulated requesting light and power commission to construct water softening plant at an estimated expense of $16,000. Glen Schwertley is village clerk.

VINTON, IOWA—Benton county rural electric co-operative association has applied to board of railroad commissioners for permission to construct 417 miles of rural transmission lines costing $700,000.

WEBSTER CITY, IOWA—City is considering construction of power plant addition and installation of 2000-kwh turbine at a total cost of about $100,000. B. F. Paine is city clerk.

Nebraska

COLUMBUS, NEBR.—City is securing engineer to make estimates of cost of construction of new lighting system. Leo B. Woerth is city engineer.

DWIGHT, NEBR.—City has applied to PWA for funds to finance construction of waterworks system estimated to cost $26,000. H. H. Henningsen, 326 Union State Bank building, Omaha, Nebr., is consulting engineer.

HASTINGS, NEBR.—Tri-county public power and irrigation district is receiving bids until June 4 for construction of electric substation at a cost of about $200,000. H. S. Hunt, Jackson, Mich., is consulting engineer.

LINCOLN, NEBR. — Iowa-Nebraska Light & Power Co. plans extensive additions and replacements to electric, gas, ice and steam heat departments and expansion of power plant generating and transmitting facilities. Entire project is estimated to cost $1,500,000. F. J. Gunther is assistant manager in charge of operations.

OMAHA, NEBR.—Nebraska Power Co. has applied to railroad commission for permission to construct about 19 miles rural electric lines near Murdock and Elmwood, Nebr., to cost about $16,650.

Montana

MISSOULA, MONT.—Bids will be received here June 5 for construction of 73 miles distribution lines, and at Sidney, Mont., until June 1, for 100-mile project of Yellowstone Electrification association. J. M. Garrison is engineer for both projects.

SIMMS, MONT.—Sun River electrification association has been authorized to spend $100,000 for construction of 105 miles electric transmission lines in Cascade and Teton counties. Power will be furnished by Montana Power Co.

Idaho

SANDPOINT, IDAHO — City has applied for permit to divert water from Priest lake and river for proposed municipal hydroelectric plant.

Pacific Coast

DOWNEY, CALIF.—Vultee Aircraft division, Airplane Development Corp., is building plant at 928 Cerritos avenue. Structure will be 120 x 300 feet and will cost about $45,000. (Noted May 3).

LONG BEACH, CALIF.—City, harbor department, has obtained building permit for construction of wharf and contingent facilities at pier B, Outer harbor, at an estimated cost of $185,000.

LOS ANGELES—Truscon Steel Co., subsidiary of Republic Steel Corp., Cleveland, is constructing $15,000 addition to its warehouse at 5480 East Slauson avenue, here.

LOS ANGELES—Pacific Southwest Pipe Co., 2630 Holt avenue, has applied for building permit to erect warehouse and office building at 6800 South Avalon boulevard. Structure will be 31 x 90 feet, cost $4800.

LOS ANGELES—Aluminum Co. of America, 1031 South Broadway, will build a plant in Los Angeles, beginning with three structures having a combined area of 85,000 square feet. Site has been acquired at Fruitland road and Magnolia street in the Vernon district; cost of land and buildings is estimated at $750,000.

SAN DIEGO, CALIF.—General Electric Co. is erecting reinforced concrete warehouse building at a cost of $17,000.

ANACORTES, WASH.—Port Angeles Plywood Corp. has taken an option on Fidalgo lumber mill and properties and plans erection of modern plywood factory at an estimated cost of $400,000. J. J. Lucas is president.

COWICHE, WASH. — Cowiche Fruit Growers Inc. plans construction of two-story warehouse addition at an estimated cost of $38,000.

SPOKANE—Coal bunkers of Boyle Fuel Co. were destroyed by fire, May 4.

TIETON, WASH.—Yakima horticultural union is building $30,000 addition to its local plant.

Rigid Frame Structure Provides Larger Clear Areas

TEN 40-foot aisles, like this one, will provide usable space from floor to roof in the International Silver Company's new plant now under construction at Meriden, Conn. It is the first to apply the new rigid frame saw-tooth design developed by Austin Co. engineers, Cleveland. Welded columns which branch out at the top in natural tree form, support right angle members which bear the roof load and leave the interior entirely without obstruction to its full height